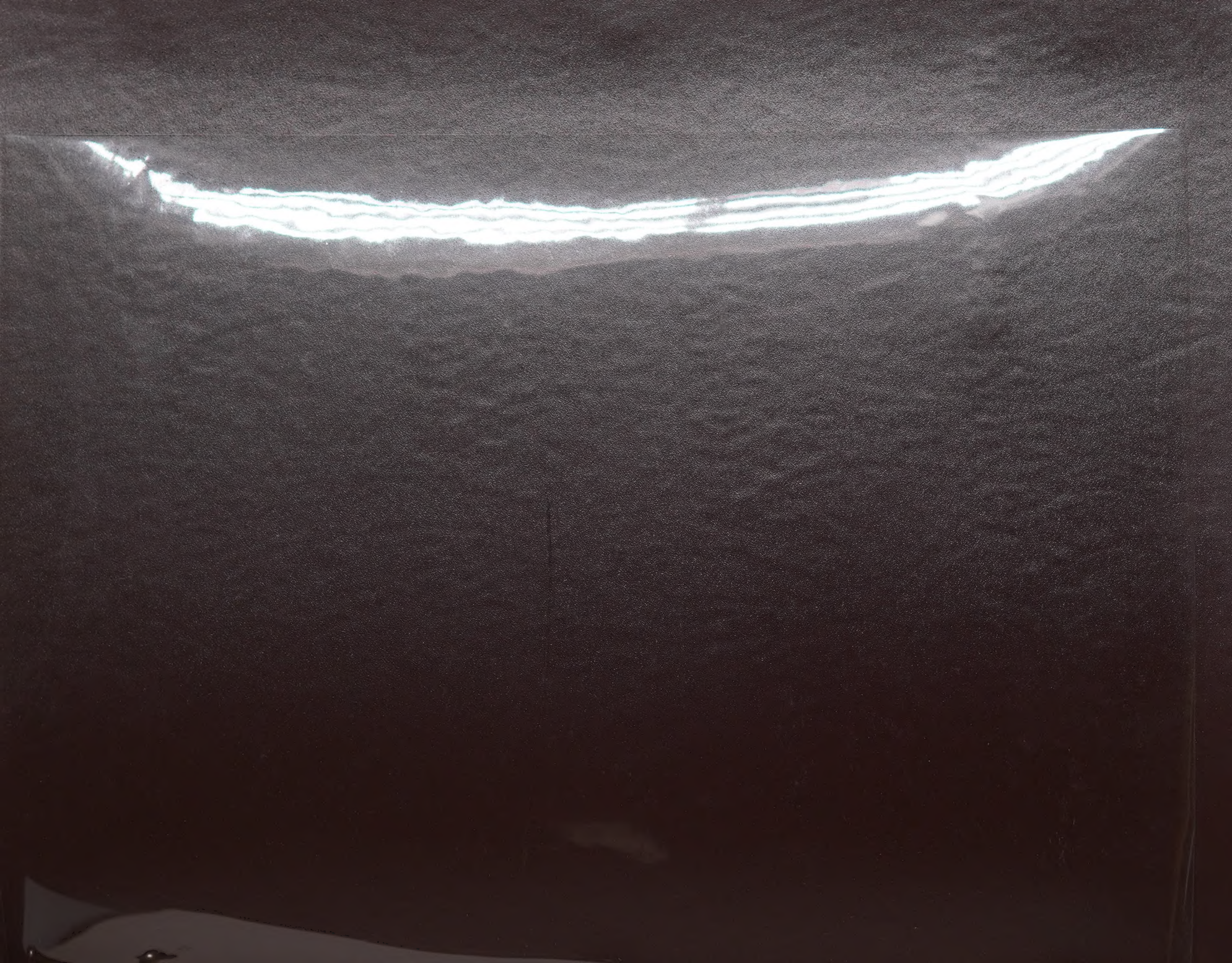
DELTA DESIGN INC.

SSR Retrofit

INSTRUCTION MANUAL

MP MASTER
MA32455

DELTA DESIGN, INC.
5775 Kearny Villa Rd.
San Diego, California 92123
(619) 292-5000
TWX: (910) 335-1215



PART NO. 1654248

SOLID STATE RELAY RETROFIT INSTRUCTIONS

FOR TYPE III AND TYPE V CONTROLLERS

Digitized by the Internet Archive
in 2025

https://archive.org/details/manualsplus_06998

COPYRIGHT/PROPRIETARY NOTICE

No part of this publication may be reproduced or used in any form or by any means -- graphic, electronic, or mechanical, including photocopying, recording, taping, or information storage and retrieval systems -- without written permission of Delta Design, Inc.

The information and design disclosed herein were originated by and are the property of Delta Design, Inc. -- Delta Design, Inc. reserves all patent, proprietary design, manufacturing, reproduction use, and sales rights thereto, and to any article disclosed thereto, and to any article disclosed therein, except to the extent rights are expressly granted to others. The foregoing does not apply to vendor proprietary parts.

Specifications remain subject to change to allow the introduction of design improvements.

©Copyright 1982
Delta Design, Inc.
5775 Kearny Villa Rd.
San Diego, CA 92123

Printed in U.S.A.

TABLE OF CONTENTS

PARA.	TITLE	PAGE
1.0	Scope	1
2.0	Procedure	1
3.0	Checkout	1
4.0	Material Disposition	1

LIST OF TABLES

TABLE	APPLICATION	PAGE
I	Index of Controller Procedures	1
II	Model A1122 Type III	2
III	Model A1160 (120VAC) TYPE III	5
IV	Model 7650 Chamber with 4-pin Terminal Block	10
V	Model 7650 Chamber without 4-pin Terminal Block	15
VI	7650/Type III Controller	22
VII	80XX Series Handlers with Type III	25
VIII	Type V Controller for Handlers	28
IX	Type V Controller for Chambers	31

LIST OF DRAWINGS

DWG. NO.	CONFIG.*	USED ON	PAGE
2631023	Triac	A1122 Type III	3
2631023	SSR	A1122 Type III	4
1635617	Triac	A1160 Type III (120VAC)	6
1635617	SSR	A1160 Type III (120VAC)	7
1635618	Triac	A1161 Type III (240VAC)	8
1635618	SSR	A1161 TYPE III (240VAC)	9
1637888B	Triac	Model 7650 (208V) with 4-pin Term. Blk.	11
1637888D	SSR	Model 7650 (208V) with 4-pin Term. Blk.	12
1637889B	Triac	Model 7650 (240V) with 4-pin Term. Blk.	13
1637889D	SSR	Model 7650 (240V) with 4-pin Term. Blk.	14
1637888	Triac	Model 7650 (208V) w/o 4-pin Term. Blk.	16
1637888	SSR	Model 7650 (208V) w/o 4-pin Term. Blk.	17
1648610	Triac	Model 7650 (208V) w/o 4-pin Term. Blk.	18
1648610	SSR	Model 7650 (208V) w/o 4-pin Term. Blk.	19
1637889	Triac	Model 7650 (240V) w/o 4-pin Term. Blk.	20
1637889	SSR	Model 7650 (240V) w/o 4-pin Term. Blk.	21
1643351	Triac	7650/Type III Controller	23
1643351	SSR	7650/Type III Controller	24
1643829	Triac	80XX Series Handlers with Type III	26
1643829	SSR	80XX Series Handlers with Type III	27
1650635	Triac	Type V Controller for Handlers	29
1650635	SSR	Type V Controller for Handlers	30
1650191	Triac	Type V Controller for Chambers	32
1650191	SSR	Type V Controller for Chambers	33

*Triac - Shows original configuration (with triac installed)
SSR - Shows retrofitted configuration (with solid state relay installed)

1.0 SCOPE

This procedure provides instructions for replacement of the triac assembly with a solid state relay (SSR) in all Type III and Type V Controllers as further defined in Table I.

TABLE I. INDEX OF CONTROLLER PROCEDURES

TABLE	APPLICATION	DRAWING NO.
II	MODEL A1122 TYPE III	2631023
III	MODEL A1160 (120VAC) TYPE III	1635617
	MODEL A1161 (240VAC) TYPE III	1635618
IV	MODEL 7650 CHAMBER WITH 4-PIN TERMINAL BLK	1637888 B (208V) 1637889 B (240V)
V	MODEL 7650 CHAMBER W/O 4-PIN TERMINAL BLK	1637888 N/C (208V, 4-WIRE) 1648610 (208V, 3-WIRE) 1637889 N/C (240V)
VI	7650/TYPE III CONTROLLER	1643351
VII	80XX SERIES HANDLERS WITH TYPE III	1643829
VIII	TYPE V CONTROLLER FOR HANDLERS	1650635
IX	TYPE V CONTROLLER FOR CHAMBERS	1650191

2.0 PROCEDURE

The procedure for replacement of the triac with the SSR is detailed in the table for the applicable unit. The general procedure is as follows:

1. Disconnect leads to the triac.
2. Remove attaching hardware securing triac and its heat sink, then remove triac. Retain attaching hardware for installation of SSR.
3. Install SSR (mounted on replacement heat sink) using hardware removed in Step 2.
4. Reconnect or add wires as required per the applicable table.

3.0 CHECKOUT.

After the replacement has been completed, check for proper operation of the temperature controller in accordance with the applicable manual.

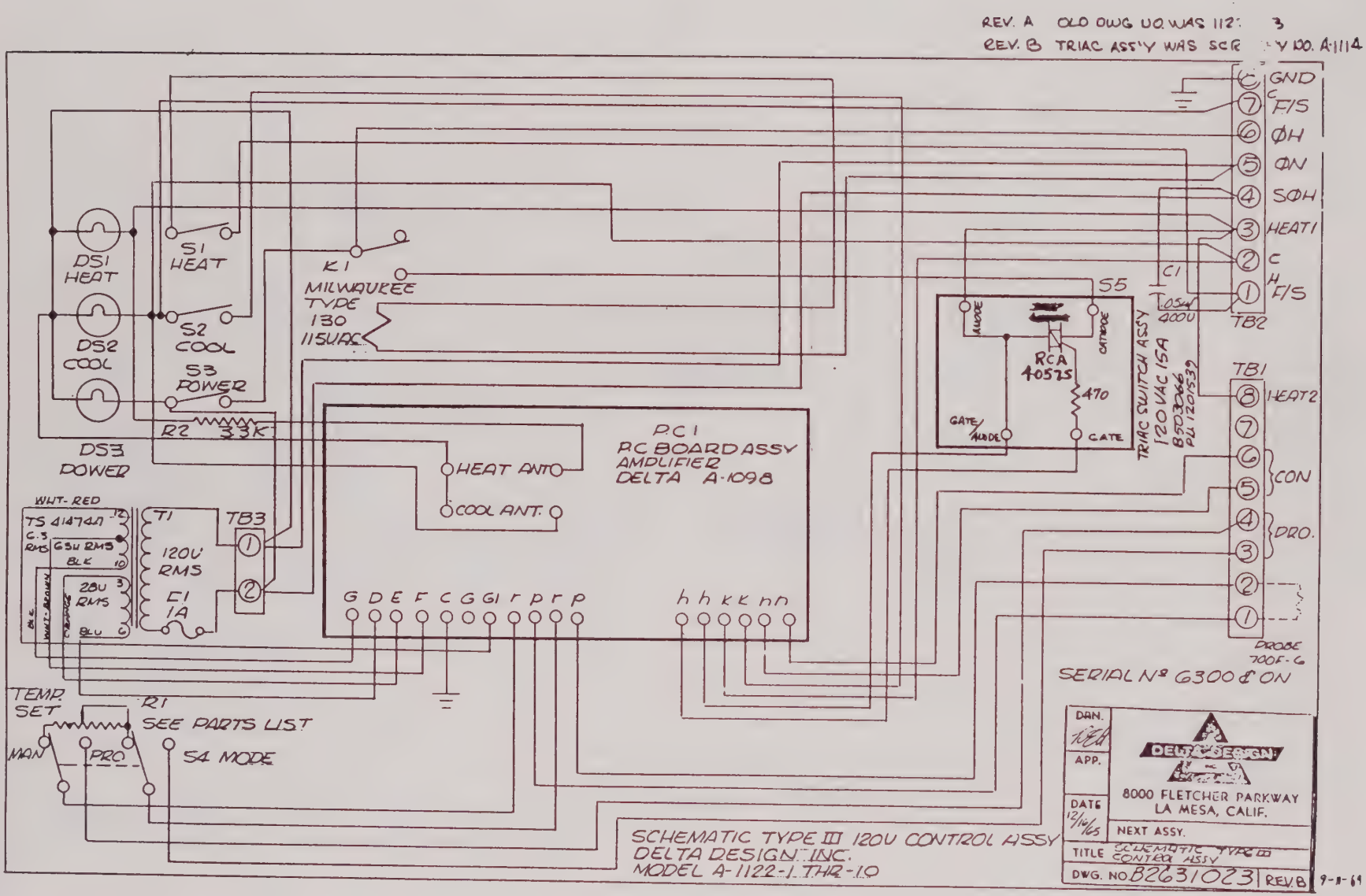
4.0 MATERIAL DISPOSITION.

Delta Design offers no allowance for the removed triac assembly, which may be dispositioned in accordance with customer procedures.

TABLE II. MODEL A1122 TYPE III

REFERENCE: DWG. NO. 2631023

OPERATION	WIRE DESCRIPTION	TRIAC CONFIGURATION FROM	TRIAC CONFIGURATION TO	SSR CONFIGURATION FROM	SSR CONFIGURATION TO
Remove & discard	AWG-20	PC1-h	Triac Anode	N/A	
Disconnect	All other wires to triac				
Reconnect	AWG-12	TB2-3	Triac Anode	TB2-3	Z1-1
		K1(NO)	Triac Cath.	K1(NO)	Z1-2
Add	AWG-20	N/A		PC1-12	Z1-4 (-)
		N/A		PC1-3	Z1-3 (+)
	AWG-24 Jumper	N/A		PC1-4	PC1-13

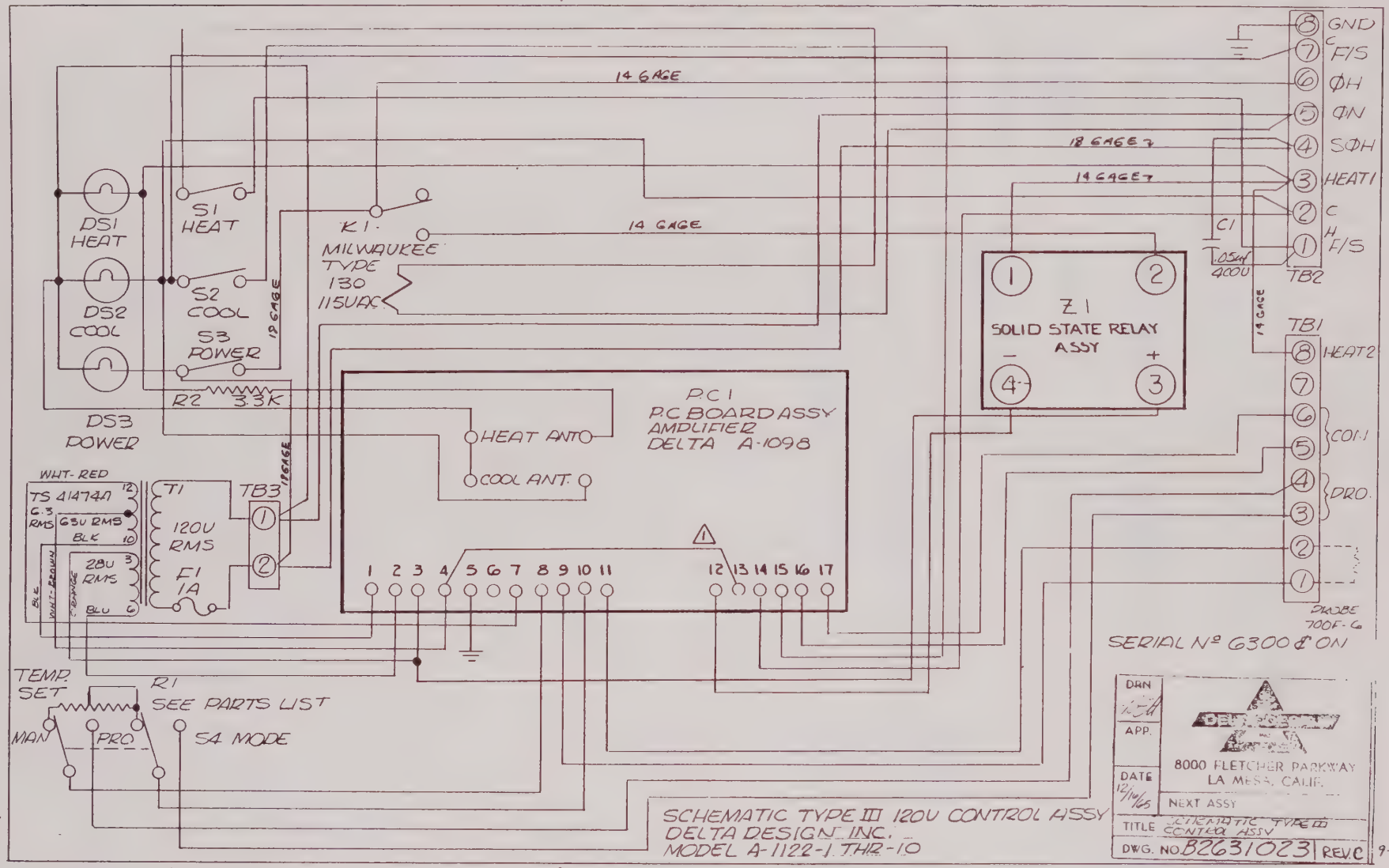

REV. A OLD DWG NO. WAS 1122-3
REV. B TRIAC ASS'Y WAS SCR ASS'Y NO. A-1114
GND
F/S
ØH
ØN
SØH
HEAT1
C
H
F/S
TB2
C1
.05μf 400V
S5
TRIAC SWITCH ASSY
120 VAC 15A
8503046
PU 1201539
ANODE
CATHODE
GATE/MODE
RCA 40575
470
GATE
TB1
HEAT2
CON
DRO.
DROOE 700F-6
DS1 HEAT
DS2 COOL
DS3 POWER
S1 HEAT
S2 COOL
S3 POWER
R2 33K
K1 MILWAUKEE TYPE 130 115VAC
WHT-RED
TS 414741
C-3
GRN
G5U RMS
BLK
28U RMS
BLU
T1
120V RMS
C1 1A
TB3
PC1
PC BOARD ASSY
AMPLIFIER
DELTA A-1098
HEAT ANT.
COOL ANT.
G D E F C G GI r p r r p
h h k k n n
TEMP SET
R1
SEE PARTS LIST
MAN
PRO
S4 MODE
SERIAL Nº G300 & ON
DAN.
APP.
DATE 12/16/65
DELTA DESIGN
8000 FLETCHER PARKWAY
LA MESA, CALIF.
NEXT ASSY.
TITLE SCHEMATIC TYPE III CONTROL ASSY
DWG. NO. B2631023
REV. B
9-1-69
SCHEMATIC TYPE III 120V CONTROL ASSY
DELTA DESIGN, INC.
MODEL A-1122-1, THR-10

REV D R. Arsiwala 8-4-82 REMOVED TRIAC ASSY, ECN 2984 ADDED SSR ASSY & NOTE 1

REV. C ADDED WIRE GAGE CALLOUT & NOTE 9-25-69

REV. A OLD DWG NO. WAS 11228-3

REV. B TRIAC ASS'Y WAS SCR ASS'Y NO. A-1114



NOTE: ALL WIRING 20 GAGE EXCEPT AS NOTED.

⚠ ADD THIS JUMPER TO BOARD AT ASSY

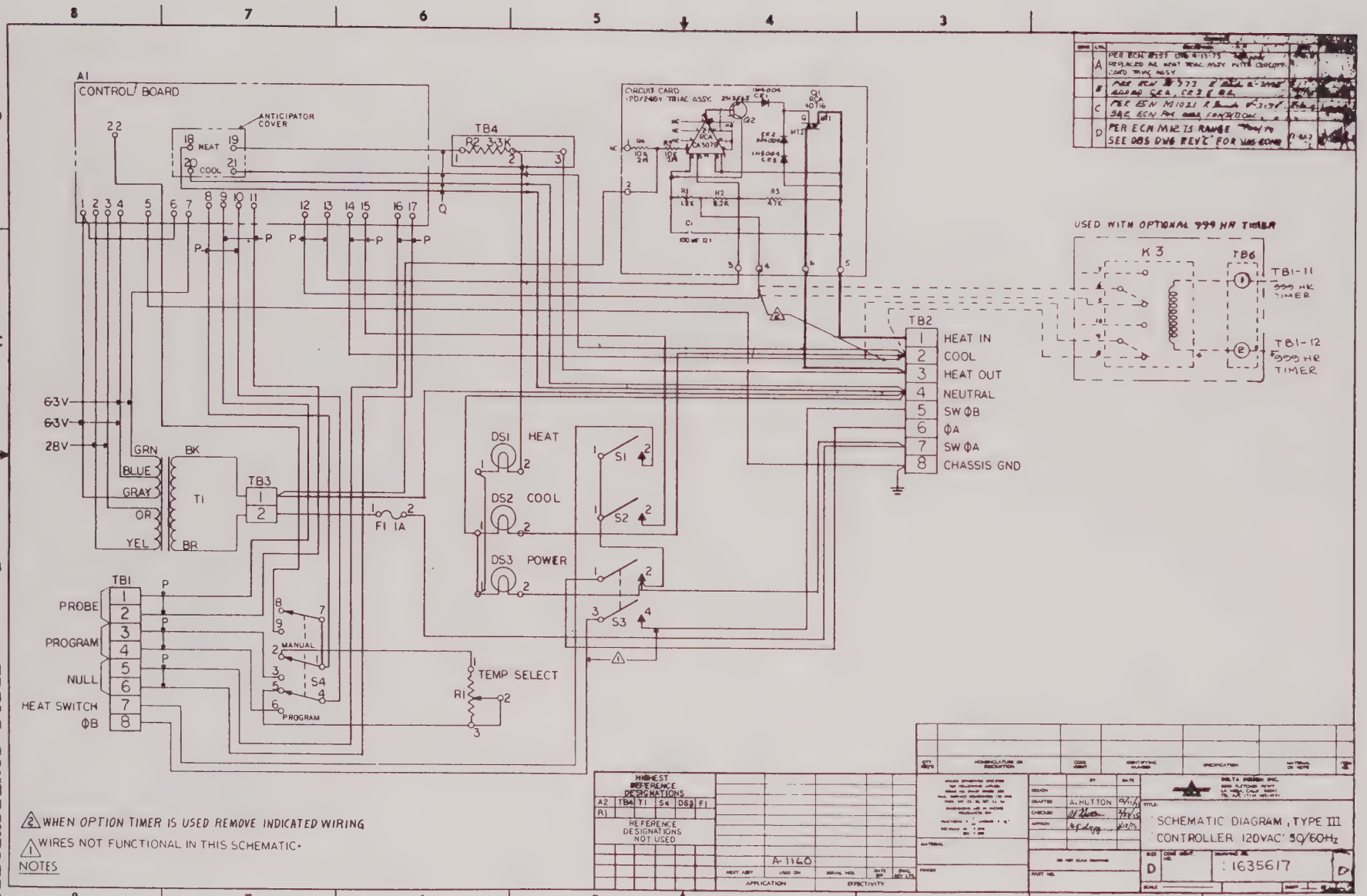
BLUE CARD

SS RELAY CONFIGURATION

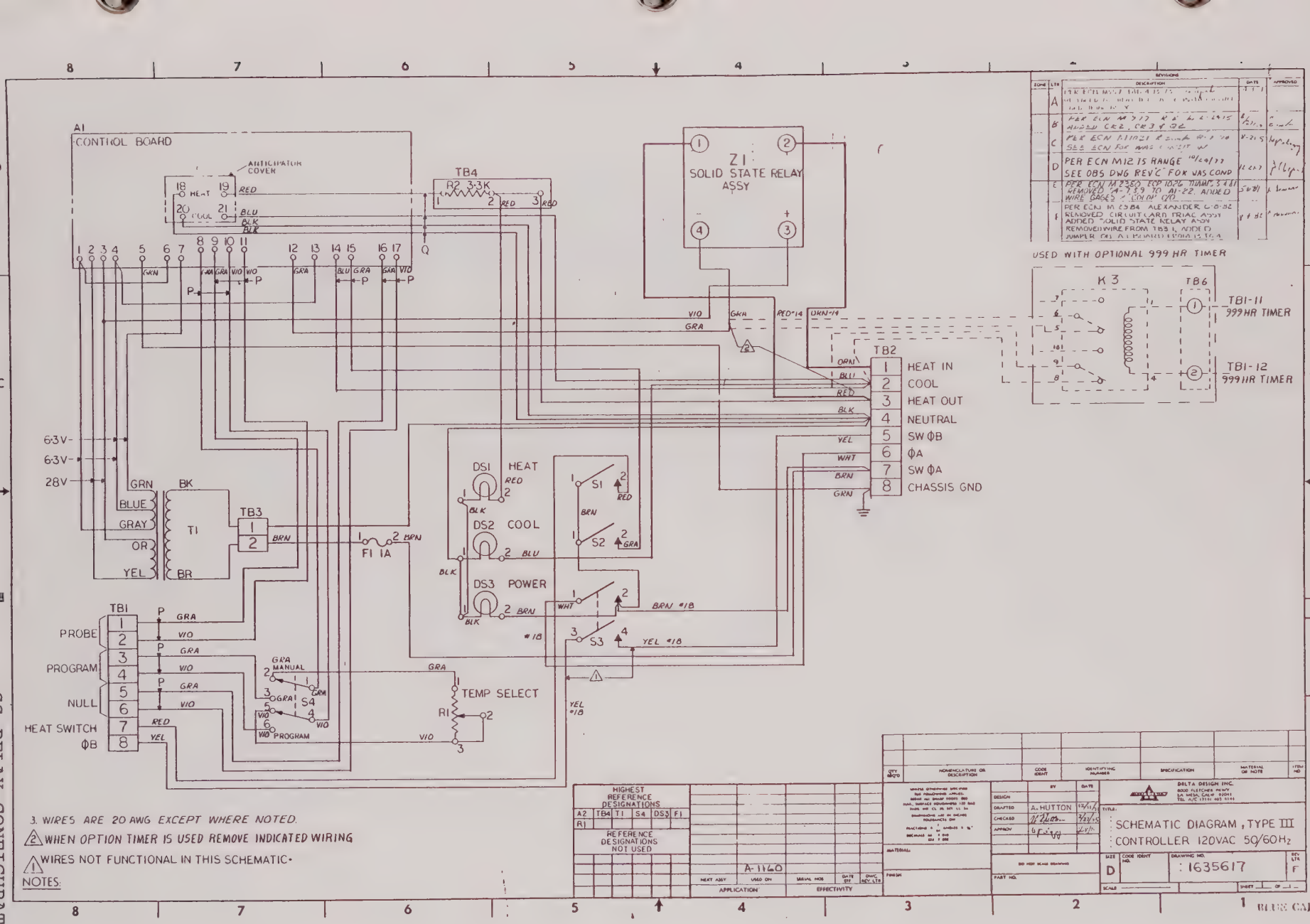
TABLE III. MODEL A1160/61 TYPE III

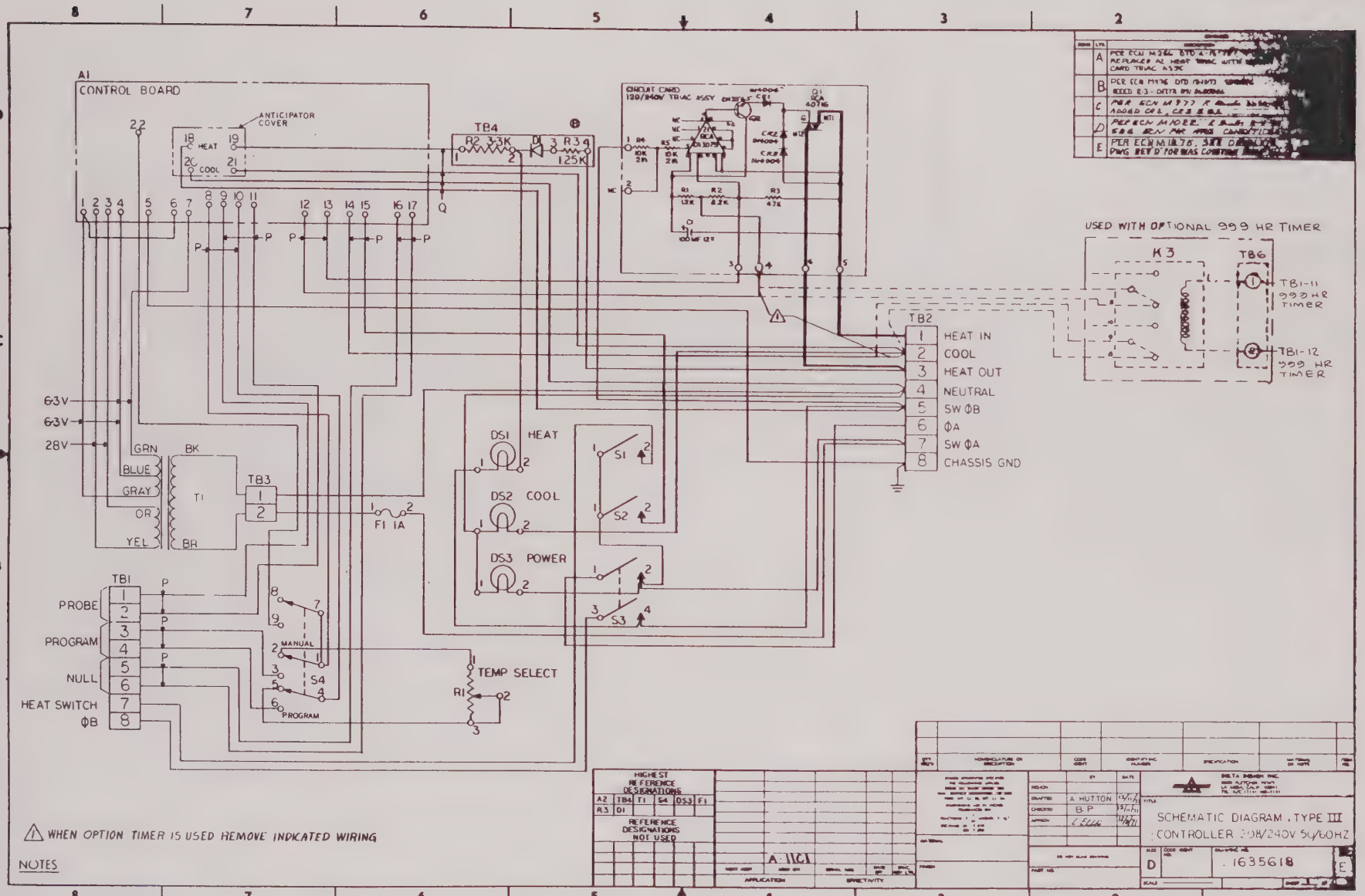
REFERENCE: DWG. NO. 1635617 (A1160 120VAC) OR 1635618 (A1161 208/240VAC)

OPERATION	WIRE DESCRIPTION	TRIAC CONFIGURATION FROM	TO	SSR CONFIGURATION FROM	TO
Remove & discard	AWG-20	A1-13	Triac Pin 3	N/A	
Disconnect	All other wires to triac				
Reconnect	AWG-12	TB2-1	Triac Pin 5	TB2-1	Z1-2
		TB2-3	Triac Pin 6	TB2-3	Z1-1
	AWG-20	A1-12	Triac Pin 4	A1-12	Z1-4 (-)
Add	AWG-20	N/A		A1-3	Z1-3 (+)
	AWG-24 Jumper	N/A		A1-4 Jumper	A1-13

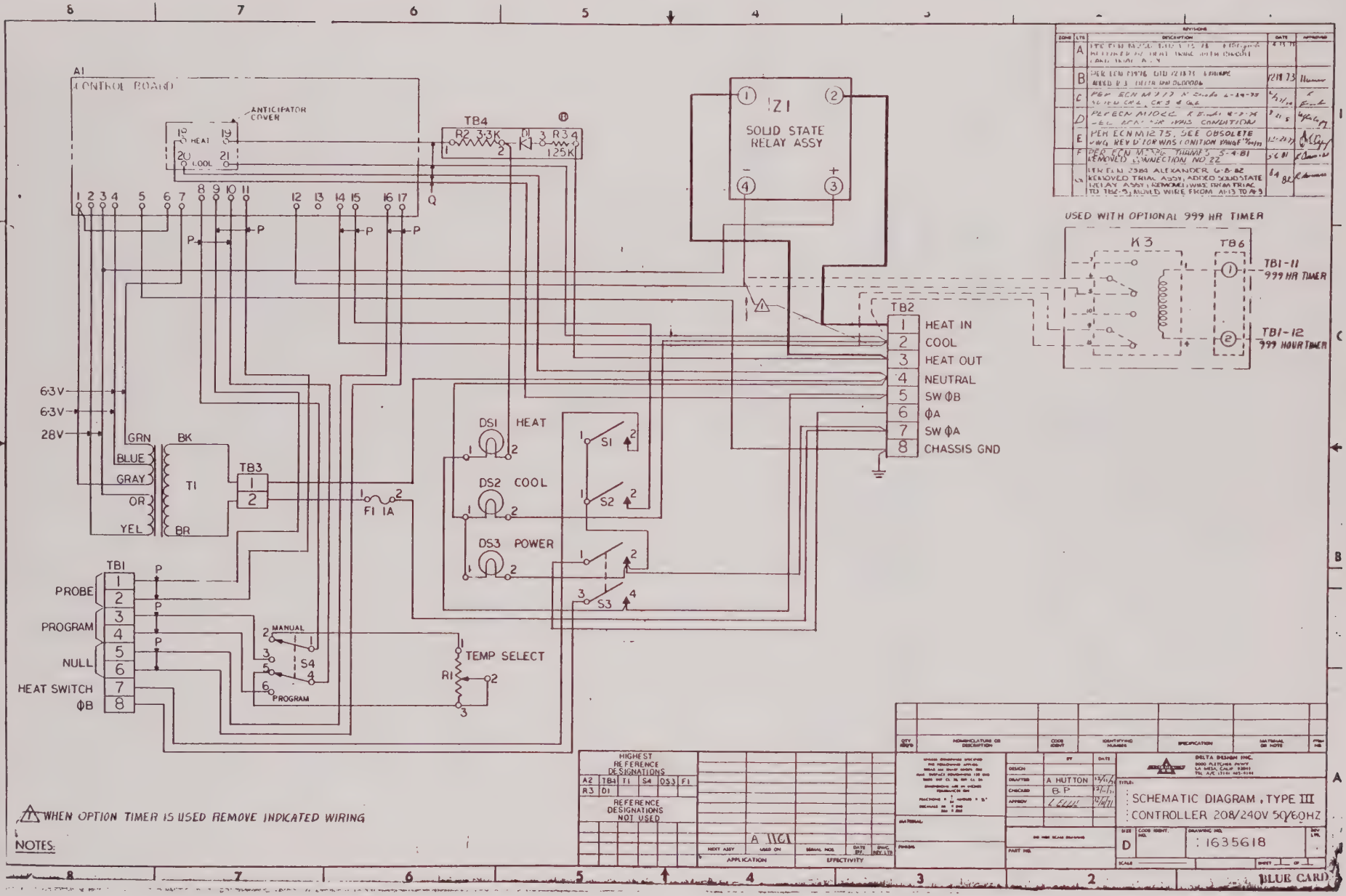


TRIAC CONFIGURATION


A1
CONTROL BOARD
ANTICIPATOR COVER
18 HEAT 19 RED
20 COOL 21 BLU
BLK
BLK
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
GRN
VIO GRA VIO WHT
GRA
BLU GRA GRA VIO
P
TB4
R2 3.3K
RED
Z1
SOLID STATE RELAY ASSY
VIO
GRA
GRN
RED-14
ORN-14
TB2
1 HEAT IN
2 COOL
3 HEAT OUT
4 NEUTRAL
5 SW ΦB
6 ΦA
7 SW ΦA
8 CHASSIS GND
ORN
BLU
RED
BLK
YEL
WHT
BRN
GRN
USED WITH OPTIONAL 999 HR TIMER
K3
TB6
TB1-11 999HR TIMER
TB1-12 999HR TIMER
6.3V~
6.3V~
28V
GRN
BK
BLUE
GRAY
OR
YEL
BR
T1
TB3
1
2
BRN
F1 1A
DS1 HEAT
RED
DS2 COOL
BLU
DS3 POWER
BRN
BLK
S1
S2
S3
BRN
GRA
WHT
BRN #18
YEL #18
#18
TB1
PROBE
PROGRAM
NULL
HEAT SWITCH ΦB
P
GRA
VIO
RED
YEL
GRA MANUAL
GRA PROGRAM
S4
TEMP SELECT
R1
VIO
3. WIRES ARE 20 AWG EXCEPT WHERE NOTED.
2 WHEN OPTION TIMER IS USED REMOVE INDICATED WIRING
1 WIRES NOT FUNCTIONAL IN THIS SCHEMATIC.
NOTES:
HIGHEST REFERENCE DESIGNATIONS
A2 TB4 T1 S4 DS3 F1
R1
REFERENCE DESIGNATIONS NOT USED
A-1160
DELTA DESIGN INC.
SCHEMATIC DIAGRAM, TYPE III
CONTROLLER 120VAC 50/60Hz
D
1635617
F
BLUE CARD
SS RELAY CONFIGURATION



TRIAC CONFIGURATION



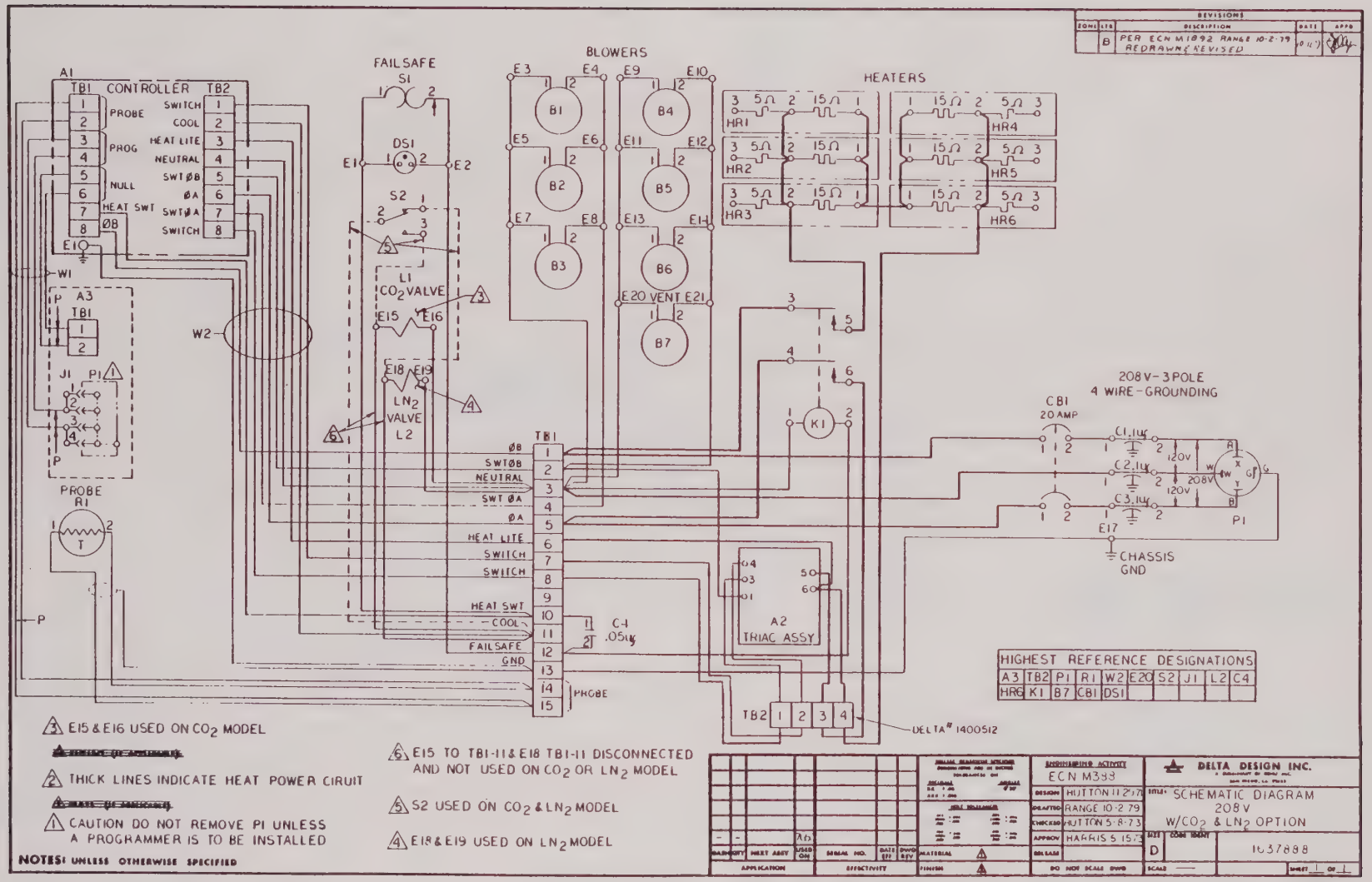
SS RELAY CONFIGURATION

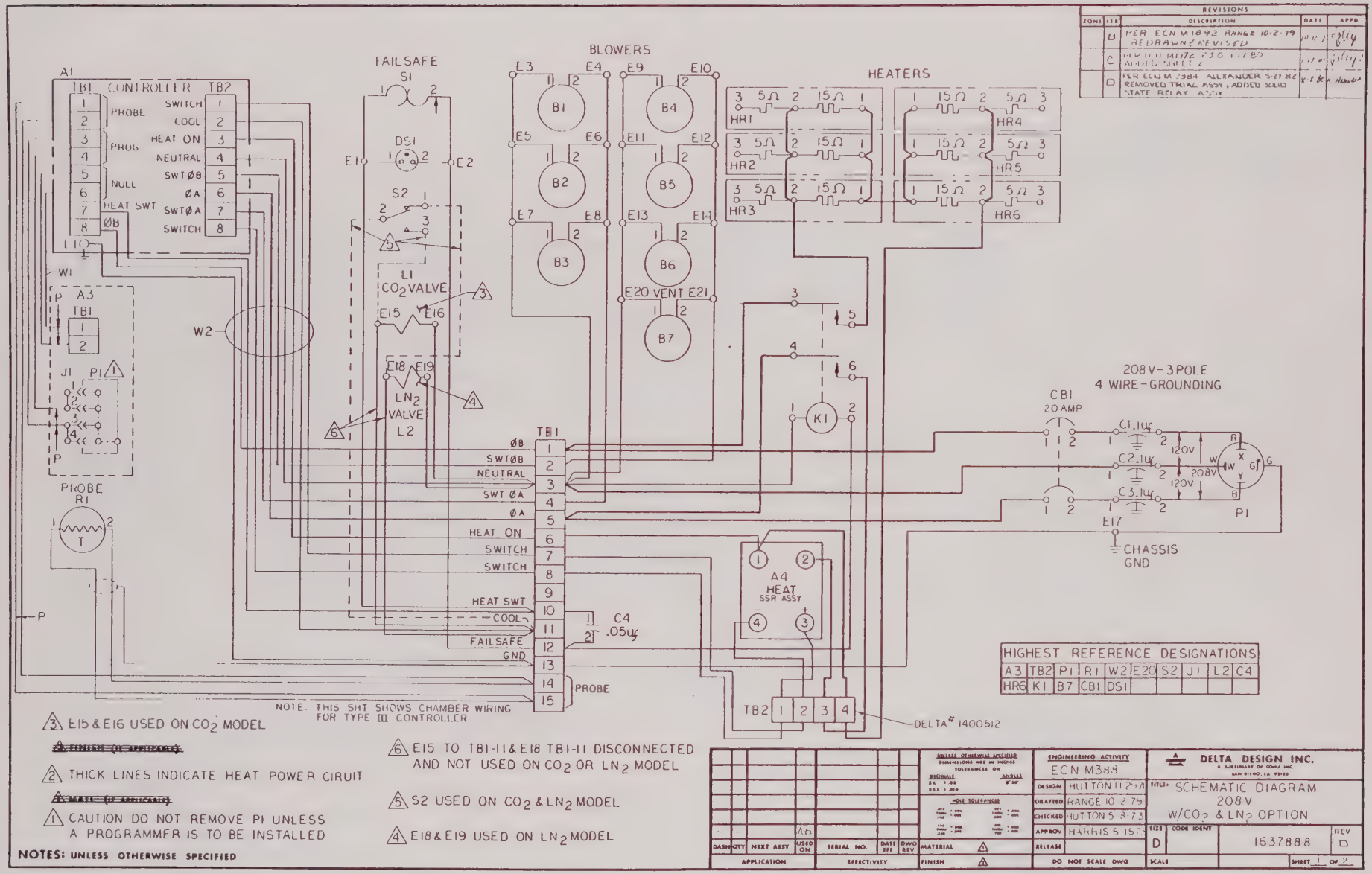
TABLE IV. MODEL 7650 WITH 4-PIN TERMINAL BLOCK

REFERENCE: DWG. NO. 1637888B (240VAC) OR 1637889B (120VAC)

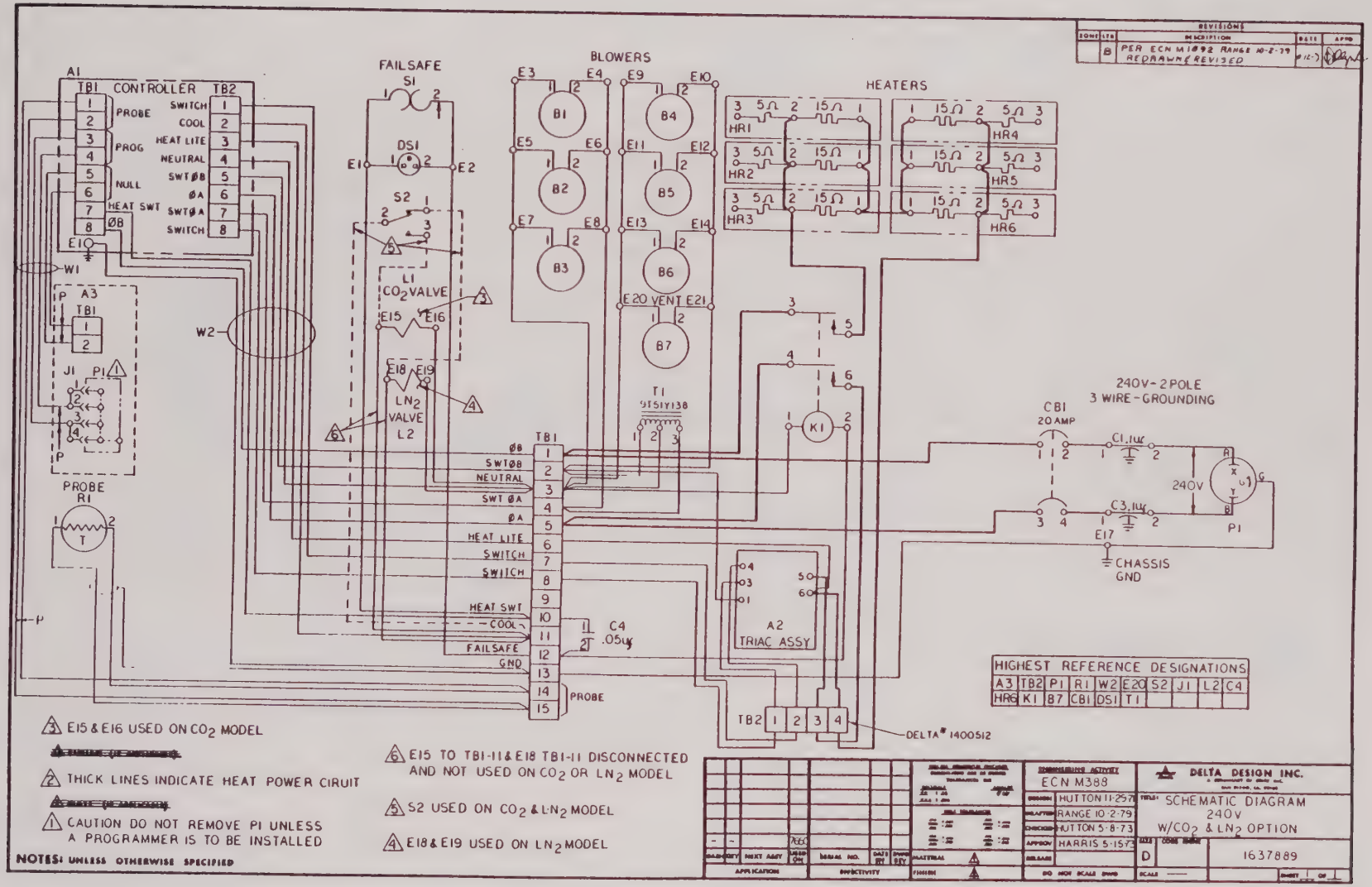
OPERATION	WIRE DESCRIPTION	TRIAC CONFIGURATION FROM	TO	SSR CONFIGURATION FROM	TO
Remove & discard	AWG-20	TB1-2	Triac Pin 1	N/A	
Disconnect	All other wires to triac				
Reconnect	AWG-20	TB2-1	Triac Pin 3	TB2-1	A4-3(+)
		TB2-2	Triac Pin 4	TB2-2	A4-4(-)
	AWG-12	TB2-3	Triac Pin 5	TB2-3	A4-2
		TB2-4	Triac Pin 6	TB2-4	A4-1
Unchanged		TB2-4	TB1-6	Same	

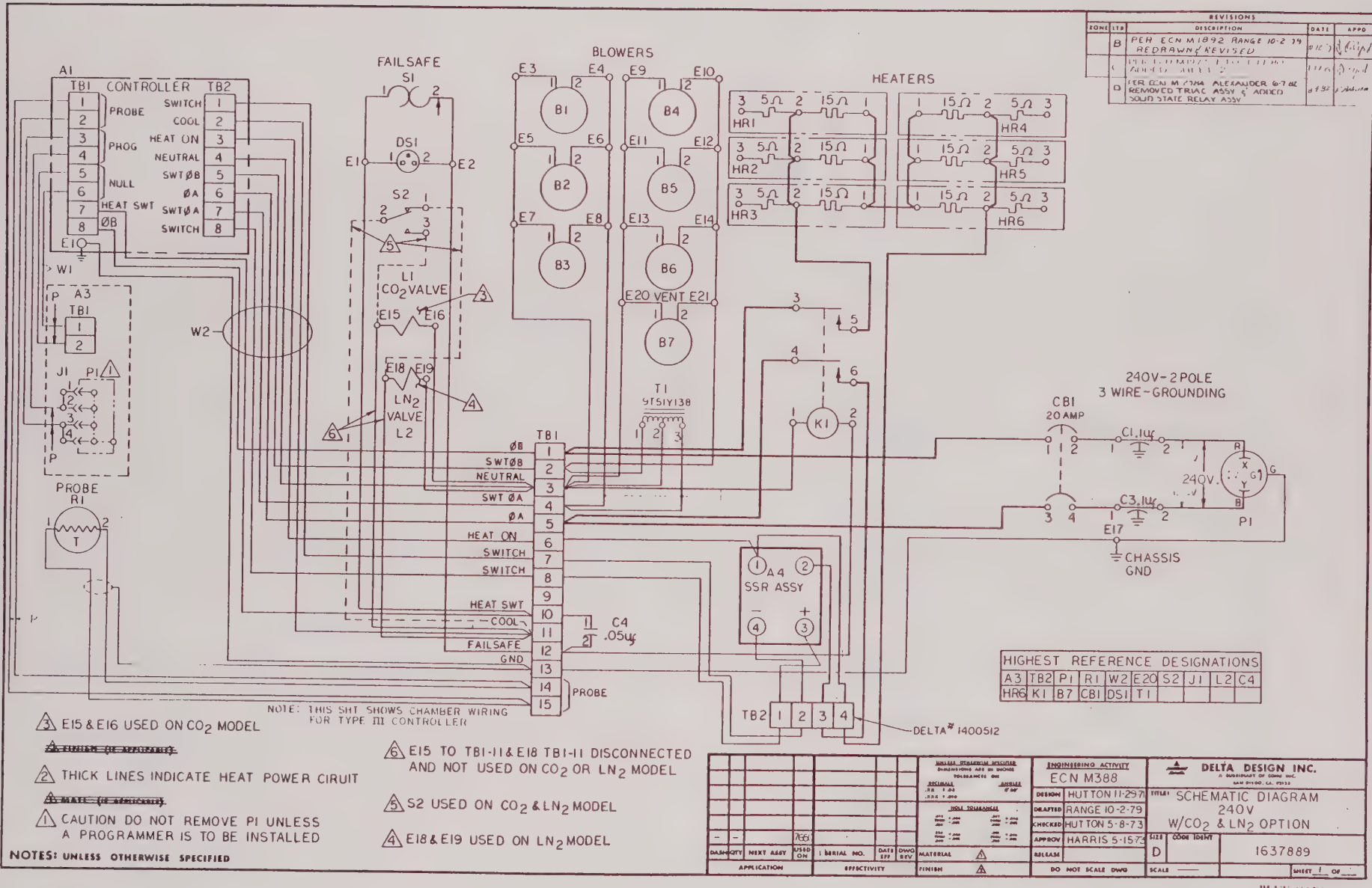
Refer to Table VI for controller wiring change


REVISIONS
ZONE LTR DESCRIPTION DATE APPD
B PER ECN M1092 RANGE 10-2-79 REDRAWN & REVISED
A1 CONTROLLER
TB1 TB2
PROBE
PROG
NULL
HEAT SWT
SWITCH
COOL
HEAT LITE
NEUTRAL
SWT ØB
ØA
SWT ØA
FAILSAFE S1
DS1
S2
L1 CO2 VALVE
LN2 VALVE L2
BLOWERS B1 B2 B3 B4 B5 B6 B7
E20 VENT E21
HEATERS HR1 HR2 HR3 HR4 HR5 HR6
A3 TB1
J1 P1
PROBE R1
W1
W2
K1
A2 TRIAC ASSY
C4 .05µf
CB1 20 AMP
208V-3 POLE 4 WIRE-GROUNDING
C1,1µf C2,1µf C3,1µf
120V
208V
P1
E17
CHASSIS GND
HIGHEST REFERENCE DESIGNATIONS
A3 TB2 P1 R1 W2 E20 S2 J1 L2 C4
HR6 K1 B7 CB1 DS1
ØB
SWTØB
NEUTRAL
SWT ØA
ØA
HEAT LITE
SWITCH
SWITCH
HEAT SWT
COOL
FAILSAFE
GND
PROBE
TB2
DELTA# 1400512
3 E15 & E16 USED ON CO2 MODEL
2 THICK LINES INDICATE HEAT POWER CIRUIT
1 CAUTION DO NOT REMOVE P1 UNLESS A PROGRAMMER IS TO BE INSTALLED
5 E15 TO TB1-11 & E18 TB1-11 DISCONNECTED AND NOT USED ON CO2 OR LN2 MODEL
5 S2 USED ON CO2 & LN2 MODEL
4 E18 & E19 USED ON LN2 MODEL
NOTES: UNLESS OTHERWISE SPECIFIED
ENGINEERING ACTIVITY ECN M383
DESIGN HUTTON 11-2-78
DRAFTING RANGE 10-2-79
CHECKED HUTTON 5-8-73
APPROV HARRIS 5-15-73
RELEASE
DO NOT SCALE DWG
DELTA DESIGN INC.
TITLE: SCHEMATIC DIAGRAM 208V W/CO2 & LN2 OPTION
SIZE D
CODE IDENT
1037888
SCALE —
SHEET 1 OF 1



SS RELAY CONFIGURATION


A1 CONTROLLER
TB1
TB2
PROBE
PROG
NULL
HEAT SWT
ØB
SWITCH
COOL
HEAT LITE
NEUTRAL
SWTØB
ØA
SWTØA
SWITCH
E1
W1
W2
A3
TB1
J1
P1
P
PROBE
R1
FAILSAFE
S1
DS1
S2
L1
CO2 VALVE
E15
E16
E18
E19
LN2 VALVE
L2
BLOWERS
B1
B2
B3
B4
B5
B6
B7
E20 VENT
E21
T1
91151Y138
HEATERS
HR1
HR2
HR3
HR4
HR5
HR6
K1
CB1
20 AMP
240V-2 POLE
3 WIRE-GROUNDING
C1.1uf
C3.1uf
240V
E17
CHASSIS
GND
ØB
SWTØB
NEUTRAL
SWT ØA
ØA
HEAT LITE
SWITCH
SWITCH
HEAT SWT
COOL
FAILSAFE
GND
PROBE
C4
.05uf
A2
TRIAC ASSY
TB2
DELTA* 1400512
HIGHEST REFERENCE DESIGNATIONS
A3 TB2 P1 R1 W2 E20 S2 J1 L2 C4
HR6 K1 B7 CB1 DS1 T1
3 E15 & E16 USED ON CO2 MODEL
2 THICK LINES INDICATE HEAT POWER CIRUIT
1 CAUTION DO NOT REMOVE P1 UNLESS A PROGRAMMER IS TO BE INSTALLED
6 E15 TO TB1-11 & E18 TB1-11 DISCONNECTED AND NOT USED ON CO2 OR LN2 MODEL
5 S2 USED ON CO2 & LN2 MODEL
4 E18 & E19 USED ON LN2 MODEL
NOTES: UNLESS OTHERWISE SPECIFIED
REVISIONS
LTR B
DESCRIPTION PER ECN M1092 RANGE 10-2-79 REDRAWN & REVISED
DATE 12-3
APPD
ENGINEERING ACTIVITY ECN M388
DRAWN HUTTON 11-2-79
CHECKED HUTTON 5-8-73
APPROV HARRIS 5-15-73
DELTA DESIGN INC.
TITLE SCHEMATIC DIAGRAM 240V W/CO2 & LN2 OPTION
SIZE D
CODE IDENT
1637889
SCALE —
SHEET OF
DO NOT SCALE DWG



NOTE: THIS SHT SHOWS CHAMBER WIRING FOR TYPE III CONTROLLER

3 E15 & E16 USED ON CO_2 MODEL

~~5 FUSES (IF APPLICABLE)~~

2 THICK LINES INDICATE HEAT POWER CIRUIT

~~6 MATS (IF APPLICABLE)~~

1 CAUTION DO NOT REMOVE P1 UNLESS A PROGRAMMER IS TO BE INSTALLED

6 E15 TO TB1-11 & E18 TB1-11 DISCONNECTED AND NOT USED ON CO_2 OR LN_2 MODEL

5 S2 USED ON CO_2 & LN_2 MODEL

4 E18 & E19 USED ON LN_2 MODEL

NOTES: UNLESS OTHERWISE SPECIFIED

HIGHEST REFERENCE DESIGNATIONS									
A3	TB2	P1	R1	W2	E20	S2	J1	L2	C4
HR6	K1	B7	CB1	DS1	T1				

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPD
	B	PER ECN M1892 RANGE 10-2 79 REDRAWN/REVISED		
	C	PER ECN M1784 ALEXANDER 6-7 80 REMOVED TRIAC ASSY & ADDED SOLID STATE RELAY ASSY		

DASH QTY	NEXT ASSY	USED ON	SERIAL NO.	DATE EFF	DWG REV	MATERIAL	ENGINEERING ACTIVITY	DELTA DESIGN INC.	
APPLICATION			EFFECTIVITY			FINISH	ECN M388		
							DESIGN: HUTTON 11-29-78	TITLE: SCHEMATIC DIAGRAM 240V W/CO_2 & LN_2 OPTION	
							DRAFTED: RANGE 10-2-79		
							CHECKED: HUTTON 5-8-73		
							APPROV: HARRIS 5-15-73	SIZE: D	CODE IDENT: 1637889
							RELEASE:	DO NOT SCALE DWG	SCALE: — SHEET 1 OF 1

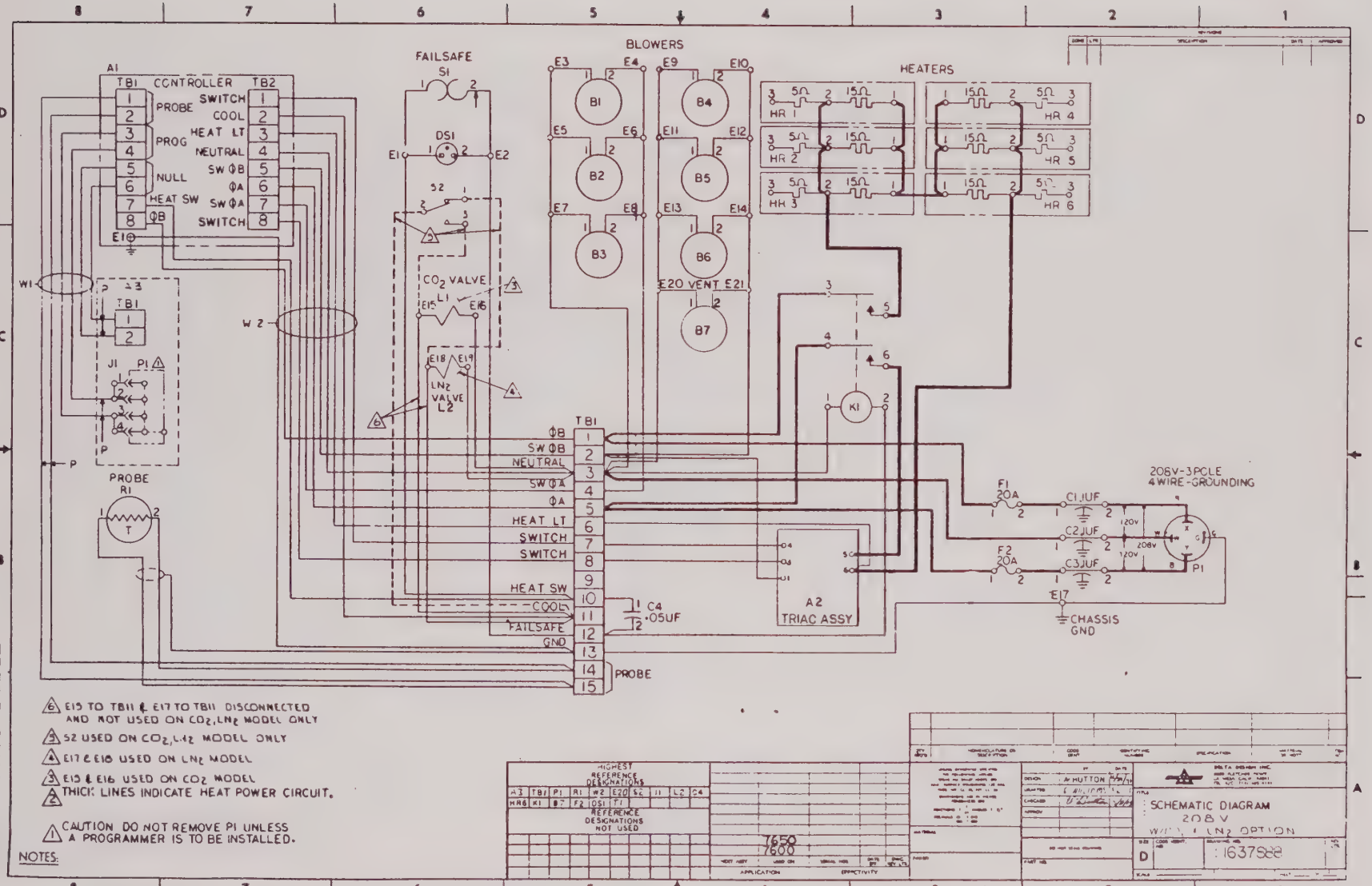
BLUE CARD

TABLE V. MODEL 7650 WITHOUT 4-PIN TERMINAL BLOCK

REFERENCE: DWG. NO. 1637888 N/C (208VAC), 1648610 (208VAC), OR 1637889 N/C (120VAC)

OPERATION	WIRE DESCRIPTION	TRIAC CONFIGURATION FROM	TO	SSR CONFIGURATION FROM	TO
Remove & discard	AWG-20	TB1-2	Triac Pin 1	N/A	
Disconnect	All other wires to triac				
Reconnect	AWG-20	TB1-8	Triac Pin 3	TB1-8	A4-3(+)
		TB1-7	Triac Pin 4	TB1-7	A4-4(-)
	AWG-12	HR6-3	Triac Pin 6	HR6-3	A4-1
		TB1-6	Triac Pin 6	TB1-6	A4-1
		K1-6	Triac Pin 5	K1-6	A4-2

Refer to Table VI for controller wiring change



6 E15 TO TB11 & E17 TO TB11 DISCONNECTED AND NOT USED ON CO_2,LN_2 MODEL ONLY

5 S2 USED ON CO_2,LN_2 MODEL ONLY

4 E17 & E18 USED ON LN_2 MODEL

3 E15 & E16 USED ON CO_2 MODEL

2 THICK LINES INDICATE HEAT POWER CIRCUIT.

1 CAUTION DO NOT REMOVE P1 UNLESS A PROGRAMMER IS TO BE INSTALLED.

NOTES:

HIGHEST REFERENCE DESIGNATIONS

A1 TB1 P1 R1 W2 E20 S2 11 L2 C4

HR6 K1 B7 F2 DS1 T1

REFERENCE DESIGNATIONS NOT USED

7650
7600

APPLICATION

EFFECTIVITY

A. HUTTON

BETA DESIGN INC.

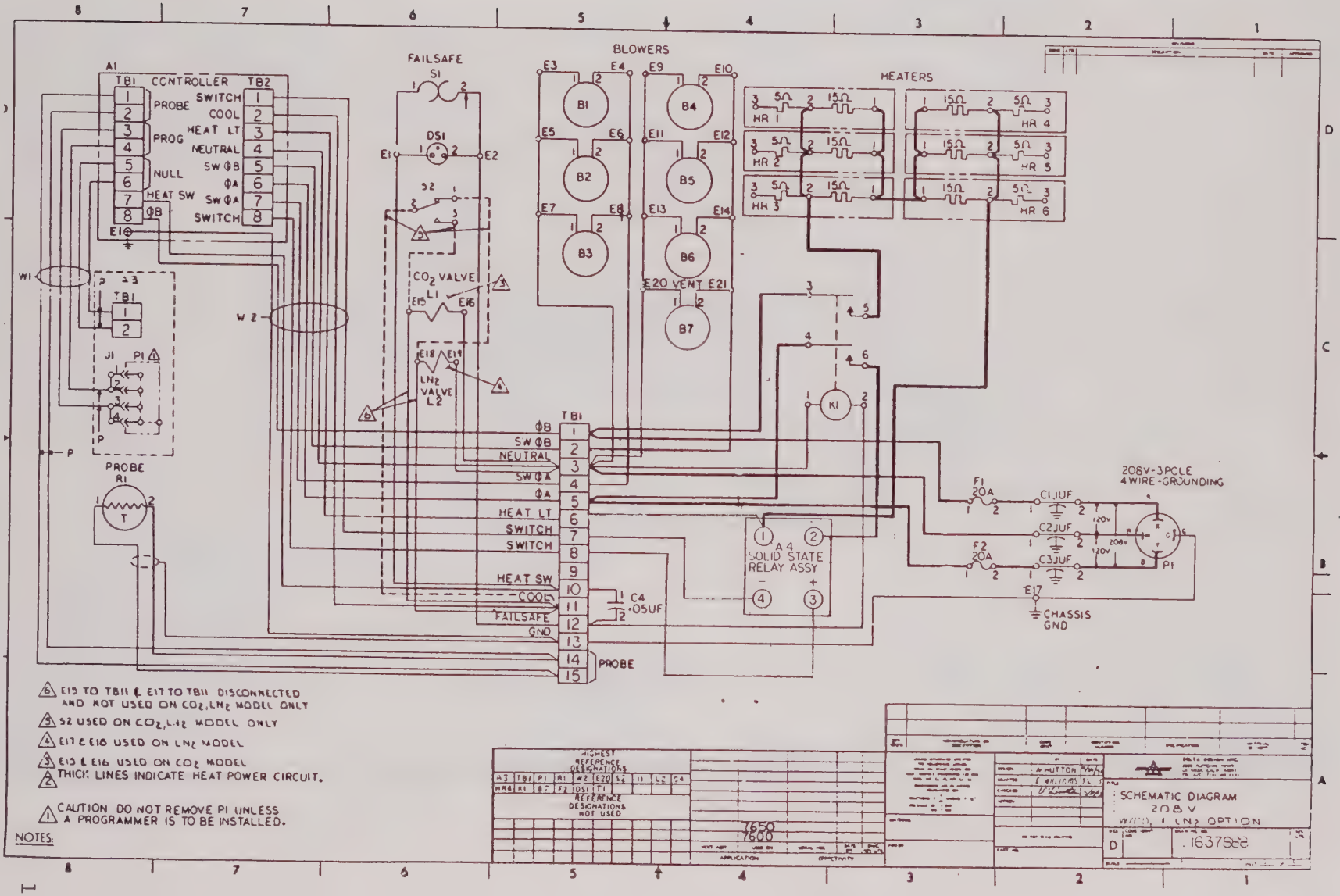
SCHEMATIC DIAGRAM
208V
W/[illegible] LN2 OPTION

D

1637882

TRIAC CONFIGURATION

16



6 E15 TO TB11 & E17 TO TB11 DISCONNECTED AND NOT USED ON CO_2,LN_2 MODEL ONLY

5 S2 USED ON CO_2,LN_2 MODEL ONLY

4 E17 & E18 USED ON LN_2 MODEL

3 E15 & E16 USED ON CO_2 MODEL

2 THICK LINES INDICATE HEAT POWER CIRCUIT.

1 CAUTION DO NOT REMOVE P1 UNLESS A PROGRAMMER IS TO BE INSTALLED.

NOTES:

HIGHEST REFERENCE DESIGNATIONS

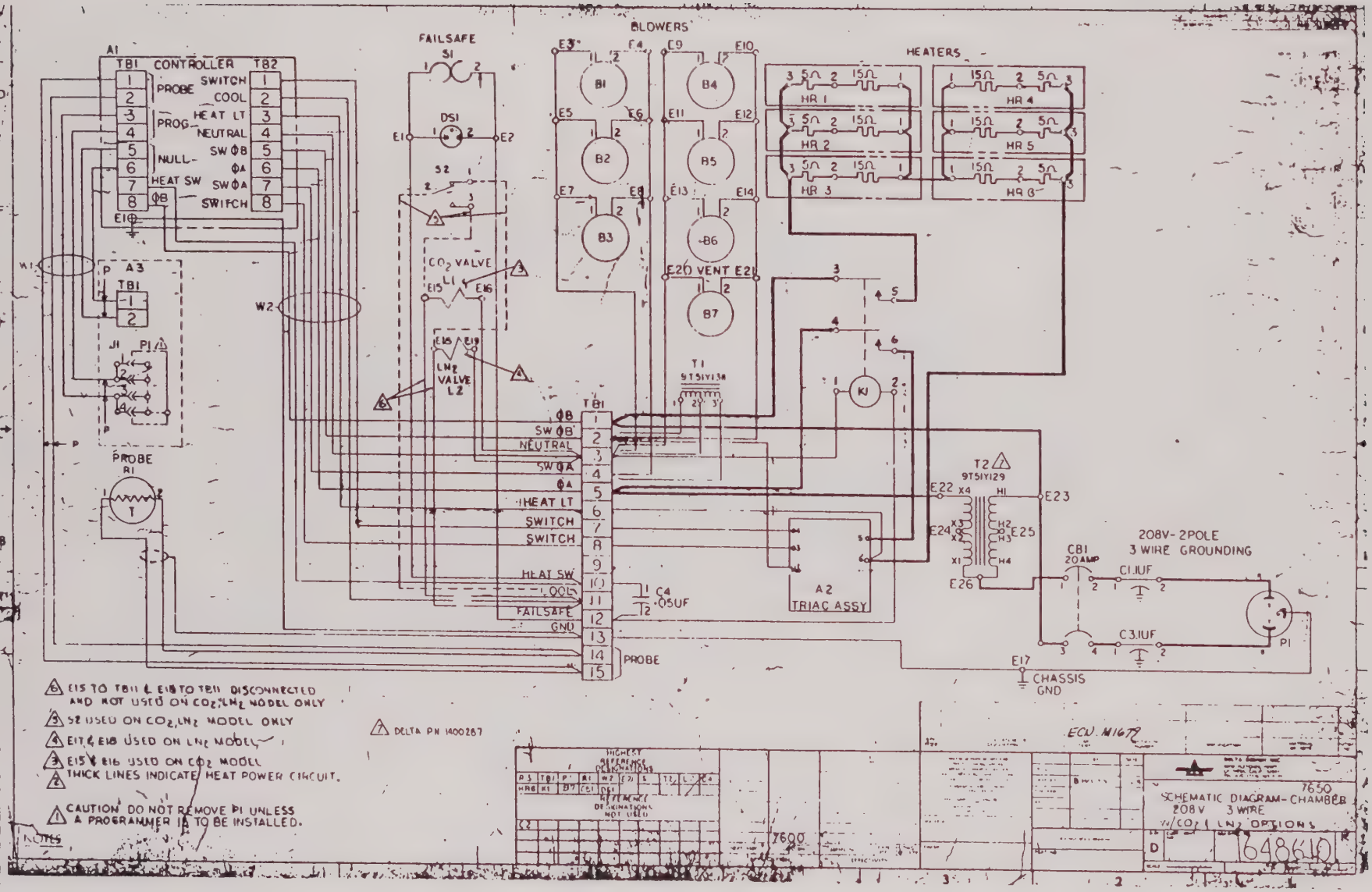
REFERENCE DESIGNATIONS NOT USED

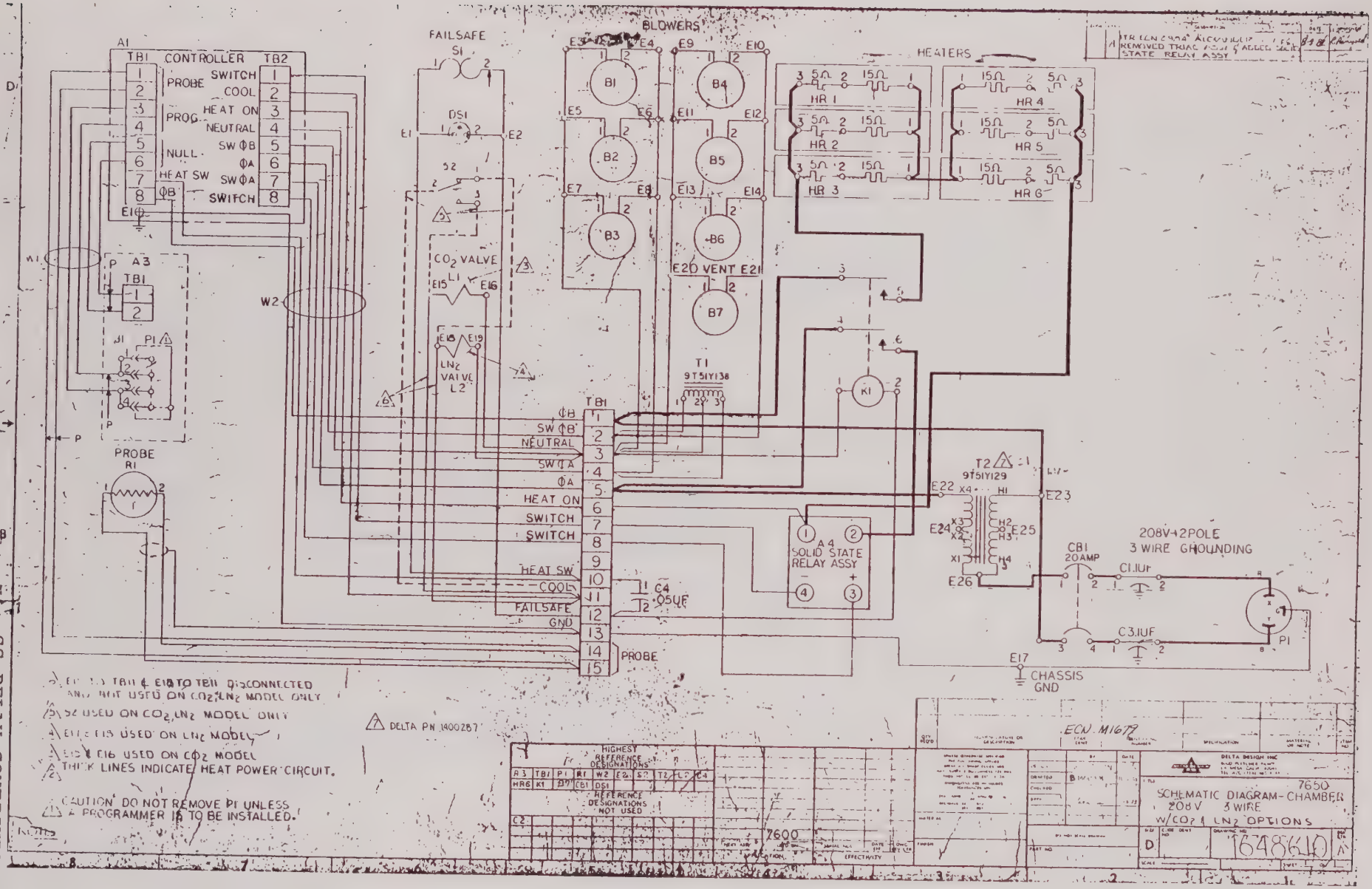
7650
7600

SCHEMATIC DIAGRAM
208 V
W/CO2 & LN2 OPTION

D 1637988

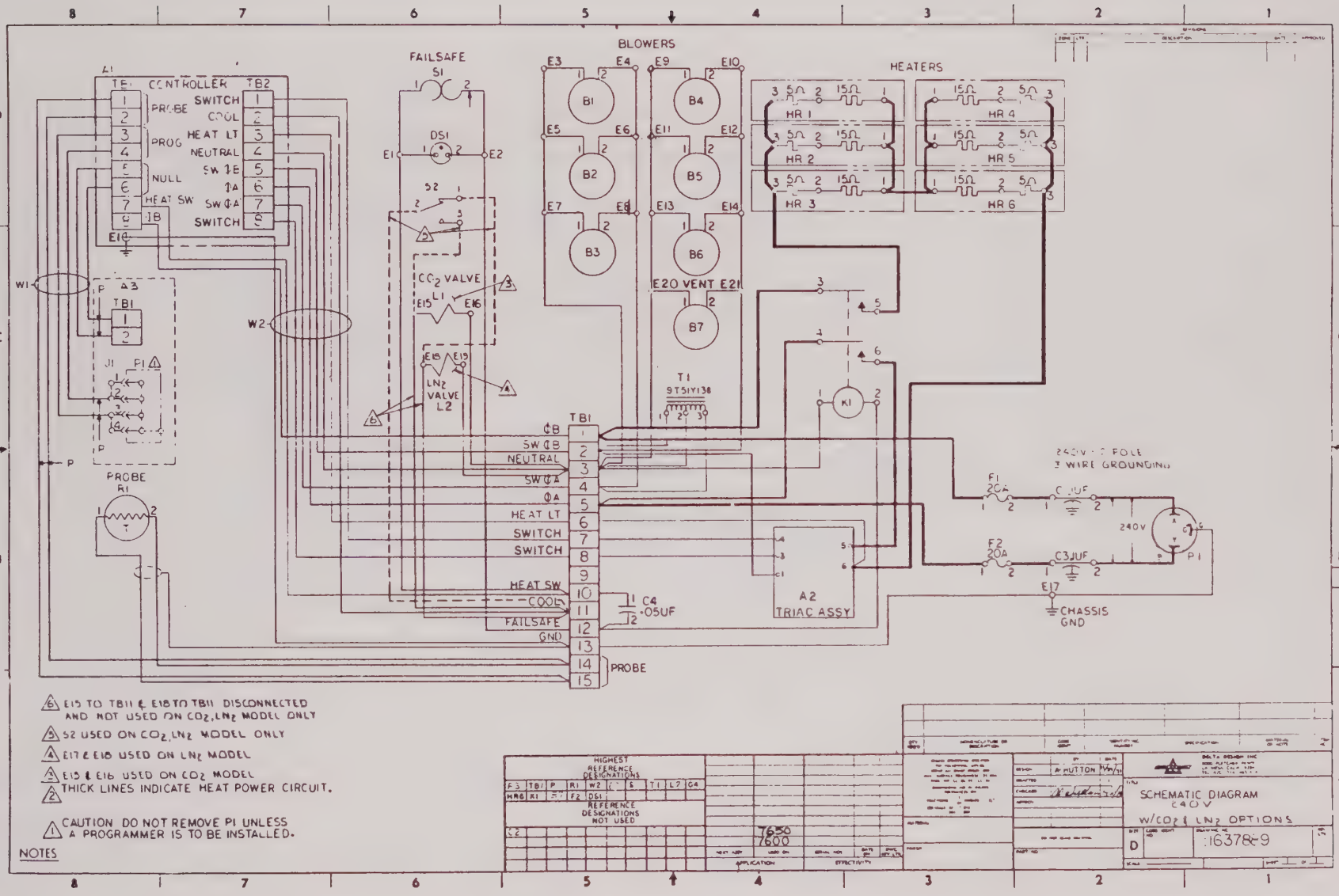
SS RELAY CONFIGURATION


A1 CONTROLLER
TB1
TB2
PROBE
SWITCH
COOL
HEAT LT
PROG
NEUTRAL
SW ΦB
NULL
ΦA
HEAT SW
SW ΦA
ΦB
SWITCH
FAILSAFE
S1
DS1
S2
CO2 VALVE
LN2 VALVE L2
BLOWERS
B1
B2
B3
B4
B5
B6
B7
E20 VENT E21
HEATERS
HR 1
HR 2
HR 3
HR 4
HR 5
HR 6
T1
9T51Y138
K1
T2
9T51Y129
A2
TRIAC ASSY
A3
P1
J1
PROBE
R1
C4
.05UF
C1.1UF
C3.1UF
CB1
20 AMP
208V-2POLE
3 WIRE GROUNDING
CHASSIS
GND
HEAT LT
SWITCH
FAILSAFE
GND
PROBE
W1
W2
E1
E2
E3
E4
E5
E6
E7
E8
E9
E10
E11
E12
E13
E14
E15
E16
E17
E18
E19
E22
E23
E24
E25
E26
1 E15 TO TB1 & E18 TO TB1 DISCONNECTED AND NOT USED ON CO2/LN2 MODEL ONLY
2 S2 USED ON CO2/LN2 MODEL ONLY
3 E17 & E18 USED ON LN2 MODEL
4 E15 & E16 USED ON CO2 MODEL
5 THICK LINES INDICATE HEAT POWER CIRCUIT.
6 CAUTION DO NOT REMOVE P1 UNLESS A PROGRAMMER IS TO BE INSTALLED.
NOTES
DELTA PN 1400287
ECO M1677
7650
SCHEMATIC DIAGRAM-CHAMBER
208 V 3 WIRE
w/CO2 / LN2 OPTIONS
D
6486610
7600

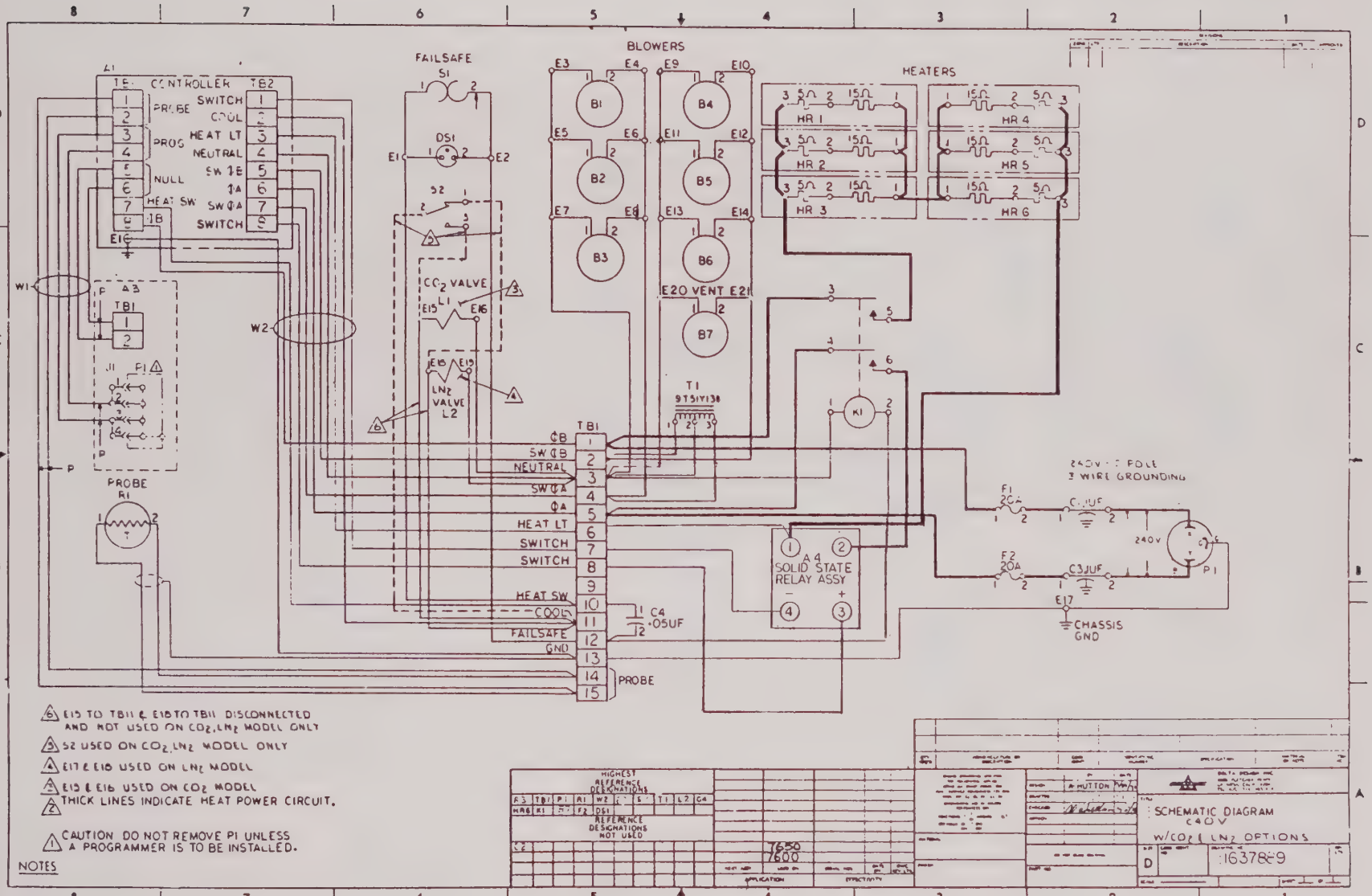


1. E1 TO TB1 & E10 TO TB1 DISCONNECTED AND NOT USED ON CO_2/LN_2 MODEL ONLY
2. S2 USED ON CO_2/LN_2 MODEL ONLY
3. E14 & E15 USED ON LN_2 MODEL
4. E15 & E16 USED ON CO_2 MODEL
5. THICK LINES INDICATE HEAT POWER CIRCUIT.
6. CAUTION DO NOT REMOVE P1 UNLESS A PROGRAMMER IS TO BE INSTALLED.

NOTES



TRIAC CONFIGURATION



NOTES

⚠ CAUTION DO NOT REMOVE P1 UNLESS A PROGRAMMER IS TO BE INSTALLED.

⚠ THICK LINES INDICATE HEAT POWER CIRCUIT.

⚠ E15 & E16 USED ON CO_2 MODEL

⚠ E17 & E18 USED ON LN_2 MODEL

⚠ S2 USED ON CO_2, LN_2 MODEL ONLY

⚠ E15 TO TBII & E18 TO TBII DISCONNECTED AND NOT USED ON CO_2, LN_2 MODEL ONLY

HIGHEST REFERENCE DESIGNATIONS

A3 | TB1 | P1 | R1 | W2 | L | S | T1 | L2 | C4

MR6 | K1 | F1 | F2 | DS1

REFERENCE DESIGNATIONS NOT USED

L2

7650
7600

SCHEMATIC DIAGRAM
240V
W/CO_2 & LN_2 OPTIONS

D | 1637859

TABLE VI. 7650/TYPE III CONTROLLER

REFERENCE: DWG. NO. 1643351

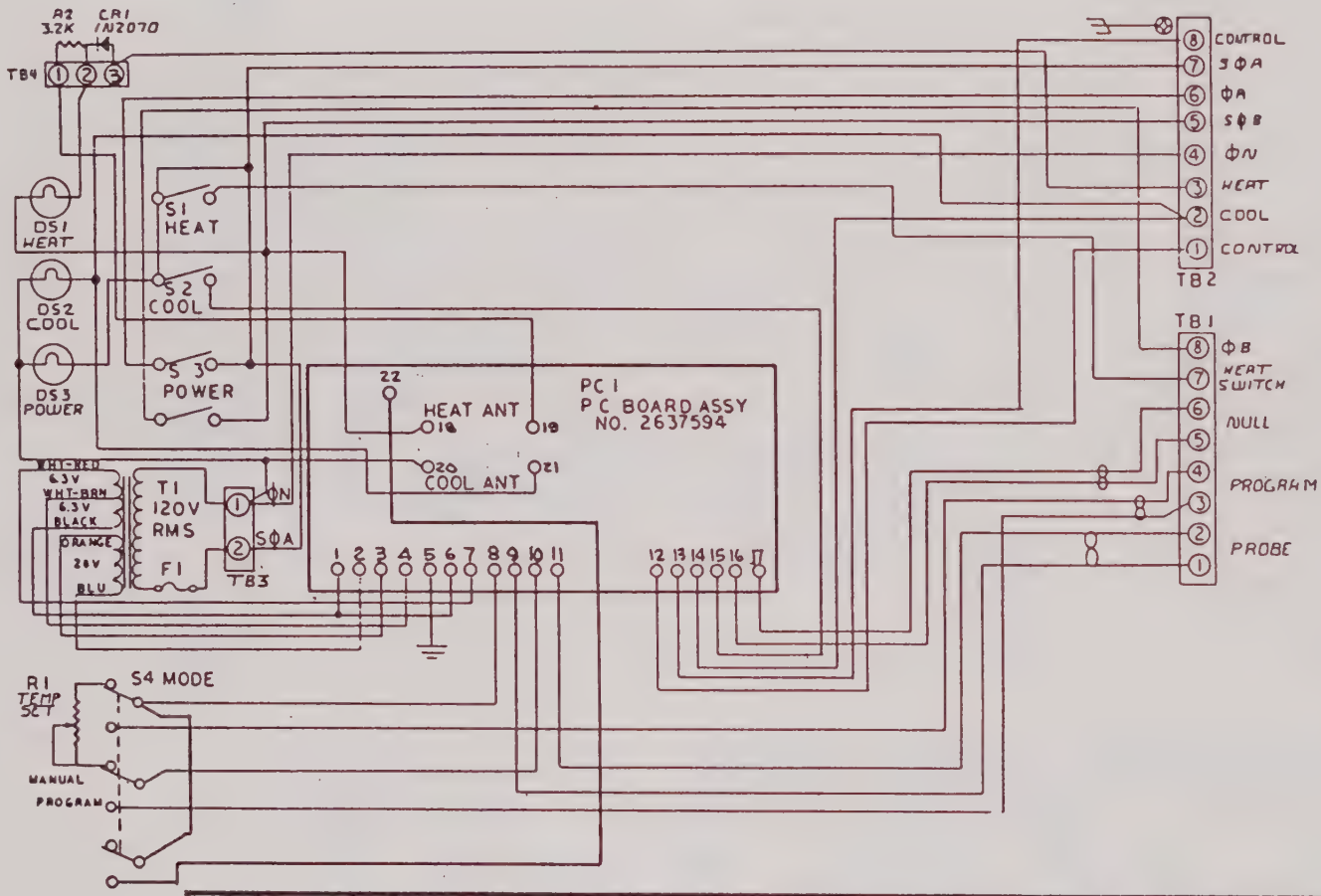
OPERATION	WIRE DESCRIPTION	TRIAC CONFIGURATION FROM	TRIAC CONFIGURATION TO	SSR CONFIGURATION FROM	SSR CONFIGURATION TO
Unchanged	AWG-20	TB2-8	PC1-13	Same	
Add	AWG-24 jumper	N/A		PC1-4	PC1-13

TABLE VII. 80XX SERIES HANDLERS WITH TYPE III

REFERENCE: DWG. NO. 1643829

OPERATION	WIRE DESCRIPTION	TRIAC CONFIGURATION FROM	TRIAC CONFIGURATION TO	SSR CONFIGURATION FROM	SSR CONFIGURATION TO
Remove & discard	AWG-22	TP1-6	Triac Pin 2	N/A	
		PCB Pin 13	Triac Pin 4		
Disconnect	All other wires to triac				
Reconnect	AWG-12	TB1-11	Triac Pin 5	TB1-11	Z1-1
		TB1-10	Triac Pin 6	TB1-10	Z1-2
	AWG-22	PCB Pin 12	Triac Pin 3	PCB Pin 12	Z1-4 (-)
Add	AWG-22	N/A		PCB Pin 3	Z1-3 (+)
	AWG-24 Jumper	N/A		PCB Pin 4	PCB Pin 13

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD



		REF															
DASH-NO'TY	NEXT ASSY	1172 USED ON	SERIAL NO.	DATE EFF	DWG REV	MATERIAL ⚠											
APPLICATION			EFFECTIVITY			FINISH ⚠											

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES: ON
DECIMALS .XX ± .03 .XXX ± .010
ANGLES ± 30'
MACH TOLERANCES

ENGINEERING ACTIVITY
ECN M 1024

DESIGN	
DRAFTED	RWILLIAMS 5-23-73
CHECKED	
APP'ROV	G. COLOPY 8-21-5
RELEASE	

DO NOT SCALE DWG

DELTA DESIGN INC.
A SUBSIDIARY OF CONRAC INC.
8738 REGENT VILLA DO SAN DIEGO, CA. 92123 - TEL (714) 292-9000

TITLE:
SCHEMATIC DIAGRAM
A1172-7650 CONTROLLER

SIZE	CODE IDENT	
C		1643351
SCALE		SHEET 1 OF 1

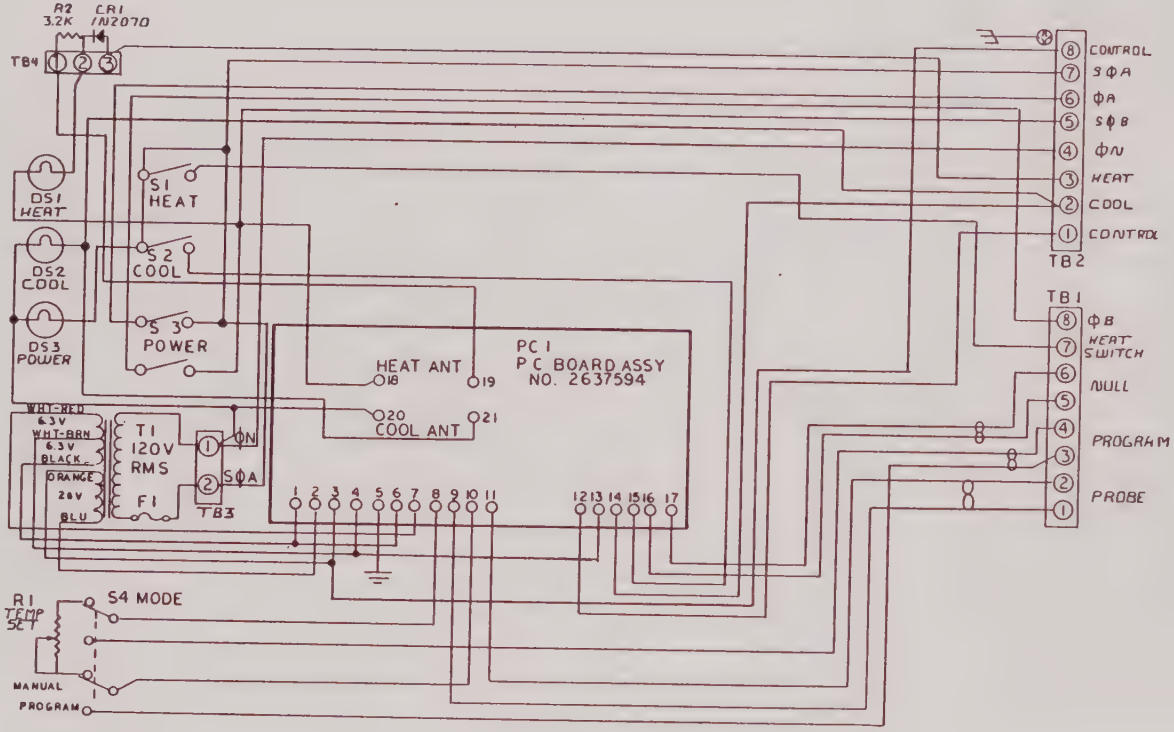
NOTES: UNLESS OTHERWISE SPECIFIED

23

⚠ FINISH (BY APPLICABLE)

⚠ MATL (BY APPLICABLE)

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD
	A	PER ECN M2363 THAMES 5-4-81 REMOVED CONNECTION NO 22	5-6-81	R Williams
	B	PER ECN M 2384 ALEXANDER 6-4-81 MOVED WIRE FROM PL1-13 TO PL1-8	8-4-81	R Williams



NOTES: UNLESS OTHERWISE SPECIFIED

⚠ FINISH (TO APPEARANCE)

⚠ MATL (TO APPEARANCE)

DASH	QTY	NEXT ASSY	USED ON
	REF		A1172
APPLICATION			

SERIAL NO.	DATE EFF	DWG REV
EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES: ON
DECIMALS .XX ± .03, .XXX ± .010
ANGLES ± 30'
HOLE TOLERANCES

MATERIAL ⚠

FINISH ⚠

ENGINEERING ACTIVITY	
	ECNM 1024
DESIGN	
DRAFTED	RWILLIAMS 5-23-73
CHECKED	
APPROV	[signature] 8-21-5
RELEASE	
DO NOT SCALE DWG	

DELTA DESIGN INC.
A SUBSIDIARY OF CONTROL DATA CORP.
8738 KEARNY VILLA RD SAN DIEGO, CA. 92123 - TEL (714) 292-5000

TITLE: SCHEMATIC DIAGRAM, A1172 CONTROLLER

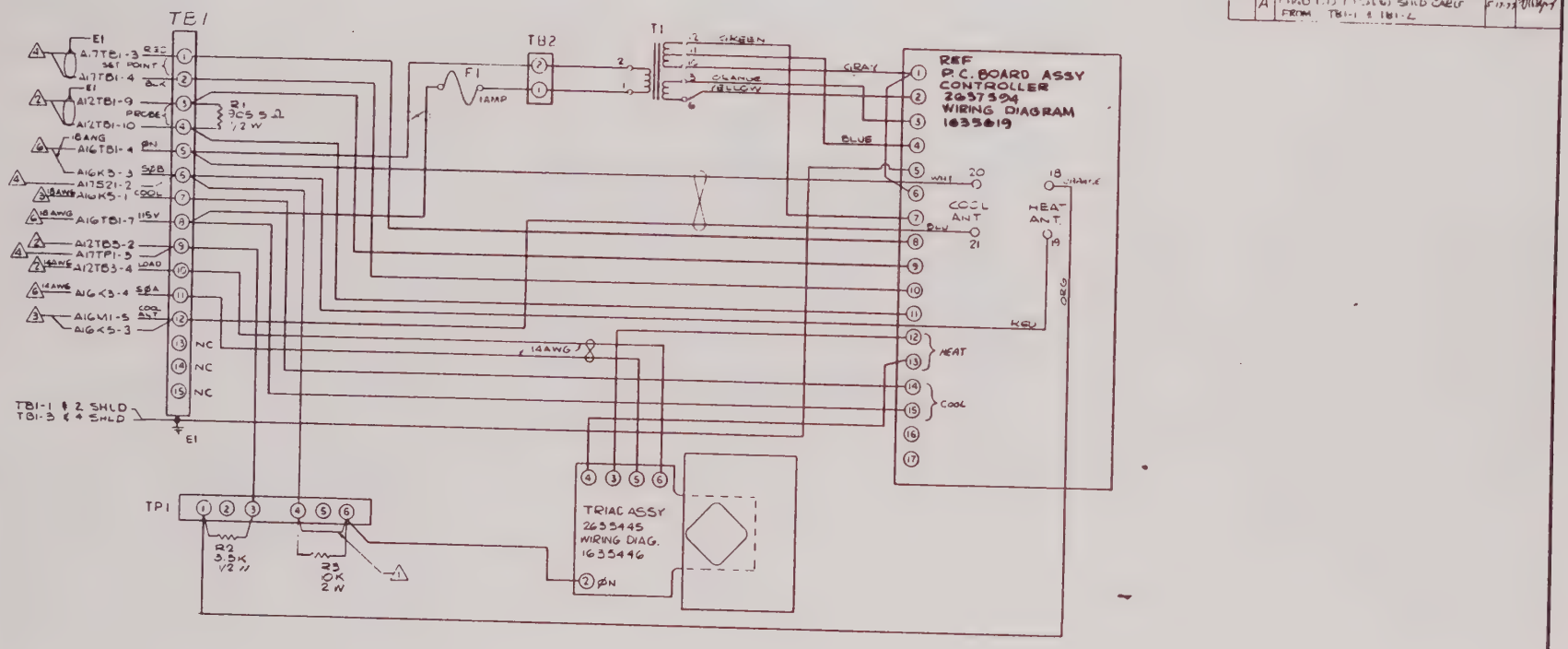
SIZE	CODE IDENT		REV
C		1643351	B
SCALE —		SHEET 1 OF 1	

BLUE CARD

TABLE VII. 80XX SERIES HANDLERS WITH TYPE III

REFERENCE: DWG. NO. 1643829

OPERATION	WIRE DESCRIPTION	TRIAC CONFIGURATION FROM	TRIAC CONFIGURATION TO	SSR CONFIGURATION FROM	SSR CONFIGURATION TO
Remove & discard	AWG-22	TP1-6	Triac Pin 2	N/A	
		PCB Pin 13	Triac Pin 4		
Disconnect	All other wires to triac				
Reconnect	AWG-12	TB1-11	Triac Pin 5	TB1-11	Z1-1
		TB1-10	Triac Pin 6	TB1-10	Z1-2
	AWG-22	PCB Pin 12	Triac Pin 3	PCB Pin 12	Z1-4 (-)
Add	AWG-22	N/A		PCB Pin 3	Z1-3 (+)
	AWG-24 Jumper	N/A		PCB Pin 4	PCB Pin 13



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD
	A	PER ECN M1180 FOLLOWING SHT 2 ADD (1) 14AWG SHLD CABLE FROM TB1-1 & TB1-2	5-17-76	

⚠ SEE WIRING DIAGRAM, A.C. POWER CHASSIS AIG, SHT. 2

5. ALL SINGLE COND. WIRE IS 22 AWG 1 PVC. ALL 2 COND SHIELDED IS BELDEN 8451 OR EQUAL.

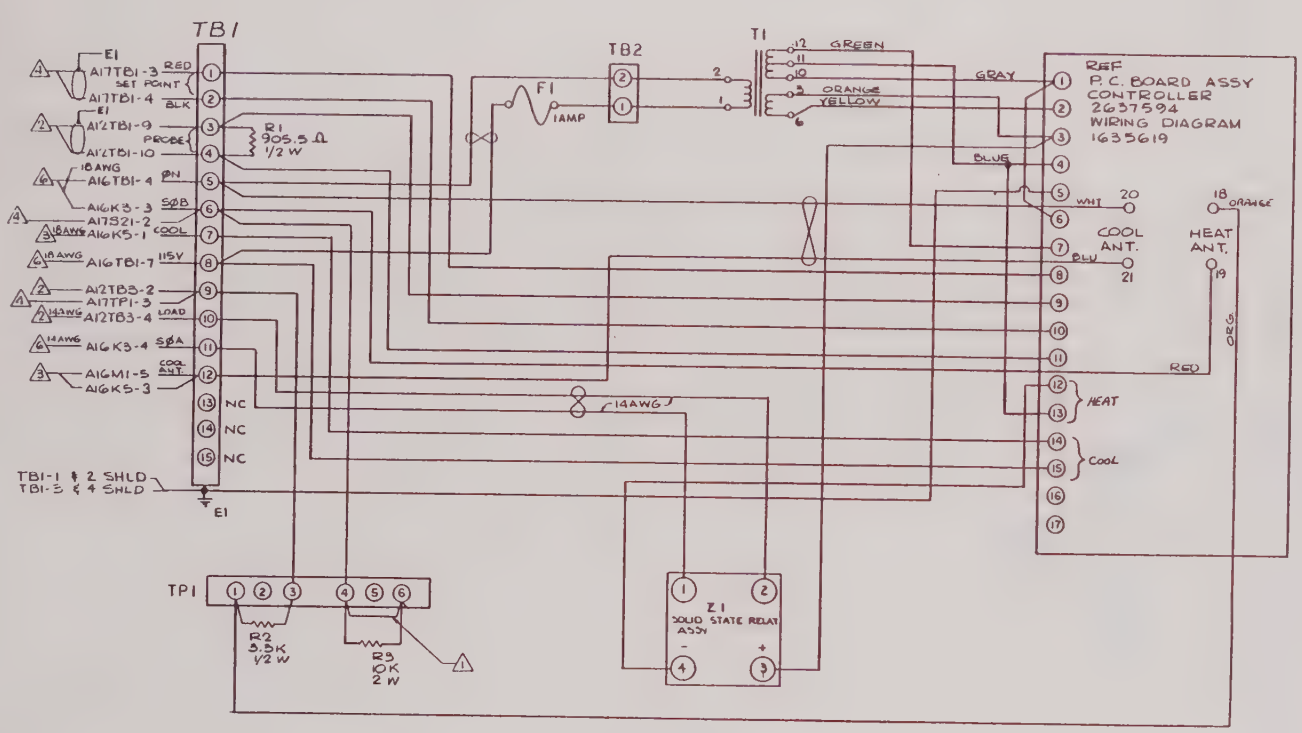
⚠ SEE WIRING DIAGRAM, CONTROL PANEL AI7, SHT 1

⚠ SEE WIRING DIAGRAM, A.C. POWER CHASSIS AIG SHT 1

⚠ SEE WIRING DIAGRAM, CHAMBER AI2.

⚠ REMOVE INDICATED CONNECTION FOR 240V OPERATION

NOTES: UNLESS OTHERWISE SPECIFIED



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD
	A	PER ECN M1180 FOLLOW SHT 7 CHGD F/D TO SHOW SHLD CABLE FROM TB1-1 & TB1-2	5-11-77	
	B	PER ECN 2984 ALEXANDER 6-8-76 REMOVED TRIAC ASSY, ADDED SOLID STATE RELAY ASSY, REMOVED WIRE FROM TP1-6 TO TRIAC, CHGD WIRING SLIGHTLY TO ACCOMODATE SSR ASSY	8-6-76	

SEE WIRING DIAGRAM, A.C. POWER CHASSIS A16, SHT. 2

FINISH (IF APPLICABLE)

5. ALL SINGLE COND. WIRE IS 22 AWG TPVC. ALL 2 COND. SHIELDED IS BELDEN 8451 OR EQUAL.

SEE WIRING DIAGRAM, CONTROL PANEL A17, SHT 1

MATE (IF APPLICABLE)

SEE WIRING DIAGRAM, A.C. POWER CHASSIS A16 SHT 1

SEE WIRING DIAGRAM, CHAMBER A12.

REMOVE INDICATED CONNECTION FOR 240V OPERATION

NOTES: UNLESS OTHERWISE SPECIFIED

						ENGINEERING ACTIVITY	DELTA DESIGN INC.
						ECN M1147	A SUBSIDIARY OF CONN INC. SAN DIEGO, CA 92138
						DESIGN	TITLE: WIRING DIAGRAM-TEMP CONTROLLER A11
						DRAFTED L. UNTIEDT 4/19/76	
						CHECKED	
						APPROV 10-31-76	SIZE D CODE IDENT 1643829 B
DASH QTY	NEXT ASSY	USED ON	SERIAL NO.	DATE EFF	DWG REV	MATERIAL	RELEASE
APPLICATION			EFFECTIVITY			FINISH	DO NOT SCALE DWG SCALE SHEET 1 OF 1

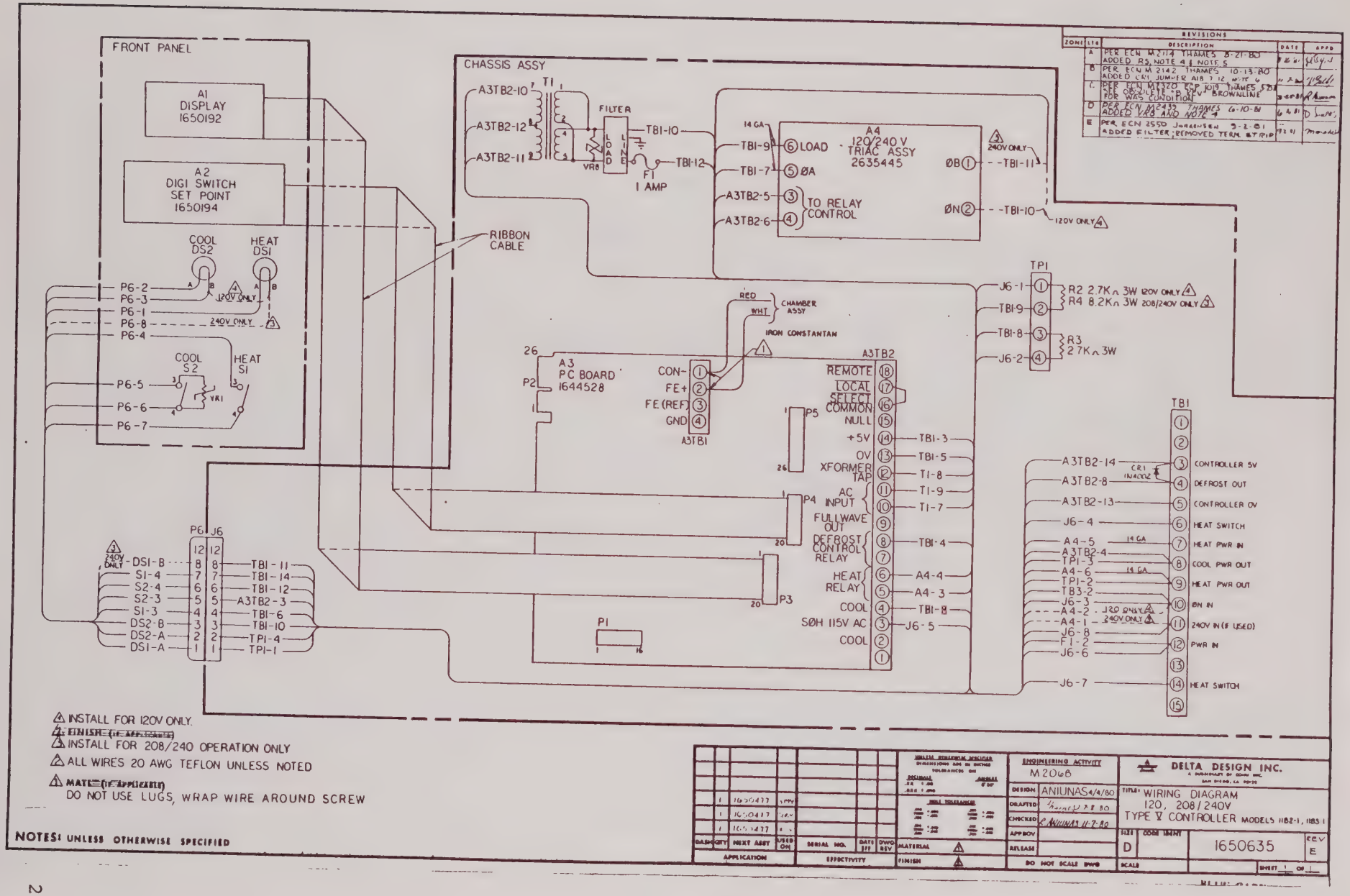
BLUE CAB

SS RELAY CONFIGURATION

TABLE VIII. TYPE V CONTROLLER FOR HANDLERS

REFERENCE: DWG. NO. 1650635

OPERATION	WIRE DESCRIPTION	TRIAC CONFIGURATION FROM	TRIAC CONFIGURATION TO	SSR CONFIGURATION FROM	SSR CONFIGURATION TO
Remove & discard	AWG-20	TB1-11	A4-1*	N/A	
		OR A3TB2-4	A4-2**	N/A	
		TB2-5	A4-3	N/A	
		TB2-6	A4-4	N/A	
	*240VAC System **120VAC System				
Disconnect	All other wires to triac				
Reconnect	AWG-12	TB1-7	A4-5	TB1-7	Z1-1
		TB1-9	A4-6	TB1-9	Z1-2
Add	AWG-20	N/A		A3TB2-14	Z1-3 (+)
		N/A		A3TB2-1	Z1-4 (-)



REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPD
	A	PER ECN M2714 THAMES 8-21-80 ADDED R3, NOTE 4 & NOTE 5	8 26 80	
	B	PER ECN M 2142 THAMES 10-13-80 ADDED CR1 JUMPER A1B 7 12 NOTE 6	11 3 80	
	C	PER ECN M2320 REP 1019 THAMES 5218 SEE OBSOLETE SP DEV BROWNLINE FOR WAS CONDITION	3-6-81	
	D	PER ECN M2432 THAMES 6-10-81 ADDED VR8 AND NOTE 7	6 4 81	
	E	PER ECN 2550 JOHANSEN 9-2-81 ADDED FILTER; REMOVED TERM. STRIP	9 3 81	

⚠ INSTALL FOR 120V ONLY.
⚠ FINISH (if applicable)
⚠ INSTALL FOR 208/240 OPERATION ONLY
⚠ ALL WIRES 20 AWG TEFLON UNLESS NOTED
⚠ MATE (if applicable)
DO NOT USE LUGS, WRAP WIRE AROUND SCREW

NOTES: UNLESS OTHERWISE SPECIFIED

1	1650477	APP	
1	1650477	DEV	
1	1650477	R	

DASH QTY | NEXT ASSY | USED ON
APPLICATION
SERIAL NO. | DATE EFF | DWG REV
EFFECTIVITY
MATERIAL ⚠
FINISH ⚠

ENGINEERING ACTIVITY M2068

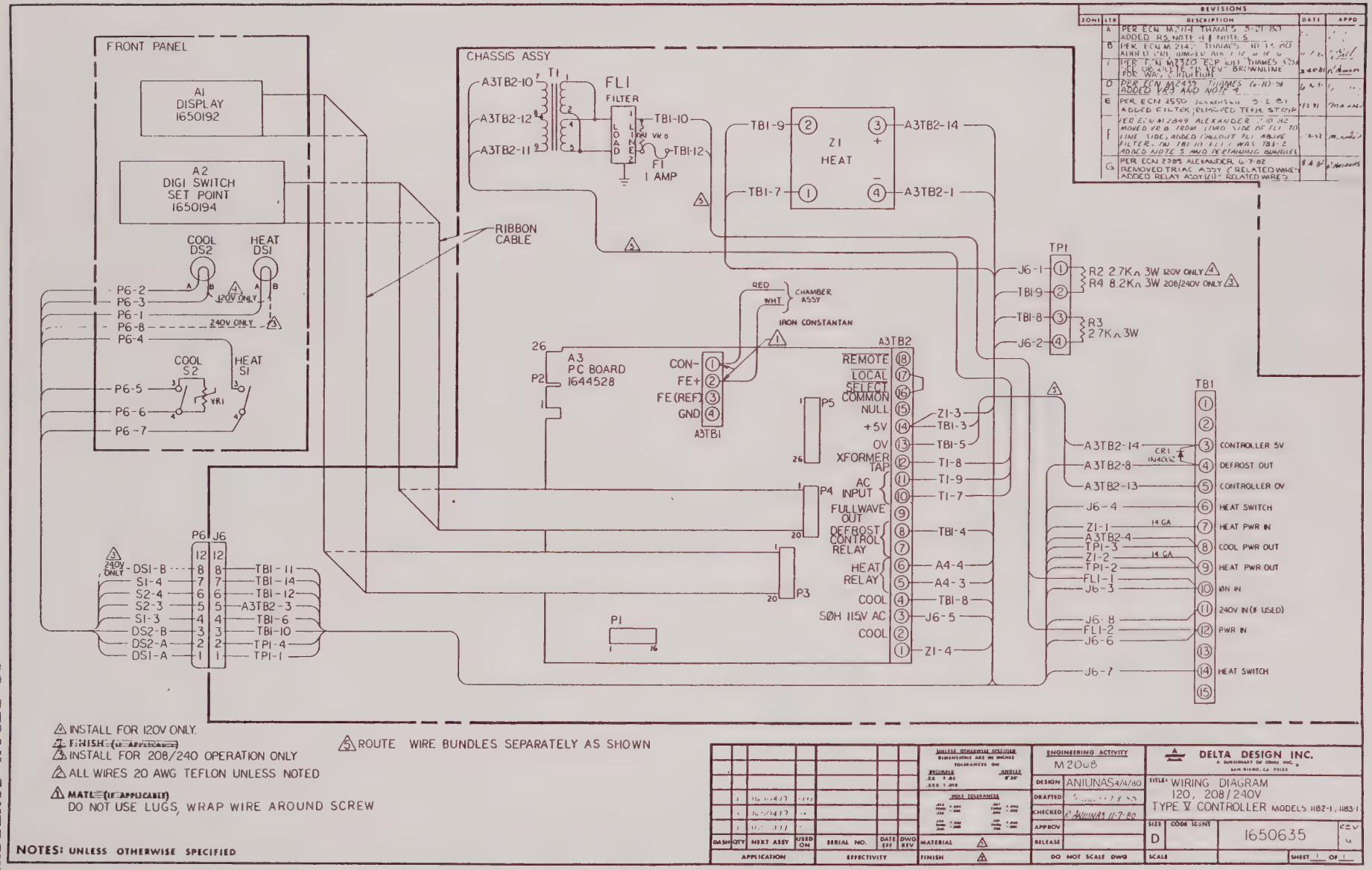
DESIGN	ANIUNAS 4/4/80
DRAFTED	11-7-80
CHECKED	ANIUNAS 11-7-80
APP'D'OV	
RELEASE	

DO NOT SCALE DWG

DELTA DESIGN INC.
A DIVISION OF COHU INC.
SAN DIEGO, CA 92123

TITLE: WIRING DIAGRAM
120, 208/240V
TYPE V CONTROLLER MODELS 1182-1, 1183-1

SIZE D | CODE IDENT NO. | 1650635 | REV E
SCALE | SHEET 1 OF 1



ZONE	LTR	DESCRIPTION	DATE	APPD
	A	PER ECN M2114 THAMES 3-21-80 ADDED R5, NOTE 4 & NOTE 5		
	B	PER ECN M 2142 THAMES 4-14-80 ADDED CR1, JUMPER ON J6 & J8		
	C	PER ECN M2320 ESP 6/81 THAMES 8/81 FOR QUALITY IN REV. BROWNLINE	8-28-81	
	D	PER ECN M2439 THAMES 6-10-82 ADDED VR3 AND NOTE 4		
	E	PER ECN 2550 JOHANSEN 3-2-83 ADDED FILTER, REMOVED TERM. STRIP		
	F	PER ECN M 2349 ALEXANDER 7-10-82 MOVED VR 8 FROM LINE SIDE OF FL1 TO LINE SIDE, ADDED FAILSAFE FL1 ABOVE FILTER. ON TBI 10 FL1-1 WAS TB3-2 ADDED NOTE 3 AND RETAINING BUNDLE		
	G	PER ECN 2385 ALEXANDER 6-7-82 REMOVED TRIAC ASSY & RELATED WIRES ADDED RELAY ASSY (1) & RELATED WIRES		

⚠ INSTALL FOR 120V ONLY.
⚠ FINISH (IF APPLICABLE)
⚠ INSTALL FOR 208/240 OPERATION ONLY
⚠ ALL WIRES 20 AWG TEFLON UNLESS NOTED
⚠ MATL (IF APPLICABLE)
DO NOT USE LUGS, WRAP WIRE AROUND SCREW

⚠ ROUTE WIRE BUNDLES SEPARATELY AS SHOWN

NOTES: UNLESS OTHERWISE SPECIFIED

ENGINEERING ACTIVITY	M2088
DESIGN	ANIUNAS 4/4/80
DRAFTED	
CHECKED	ANIUNAS 11-7-80
APPROV	
RELEASE	
DO NOT SCALE DWG	

DELTA DESIGN INC.
A SUBSIDIARY OF CDMI, INC.
SAN DIEGO, CA 92123

TITLE: WIRING DIAGRAM
120, 208/240V
TYPE V CONTROLLER MODELS 1182-1, 1183-1

SIZE	CODE IDENT		REV
D		1650635	G

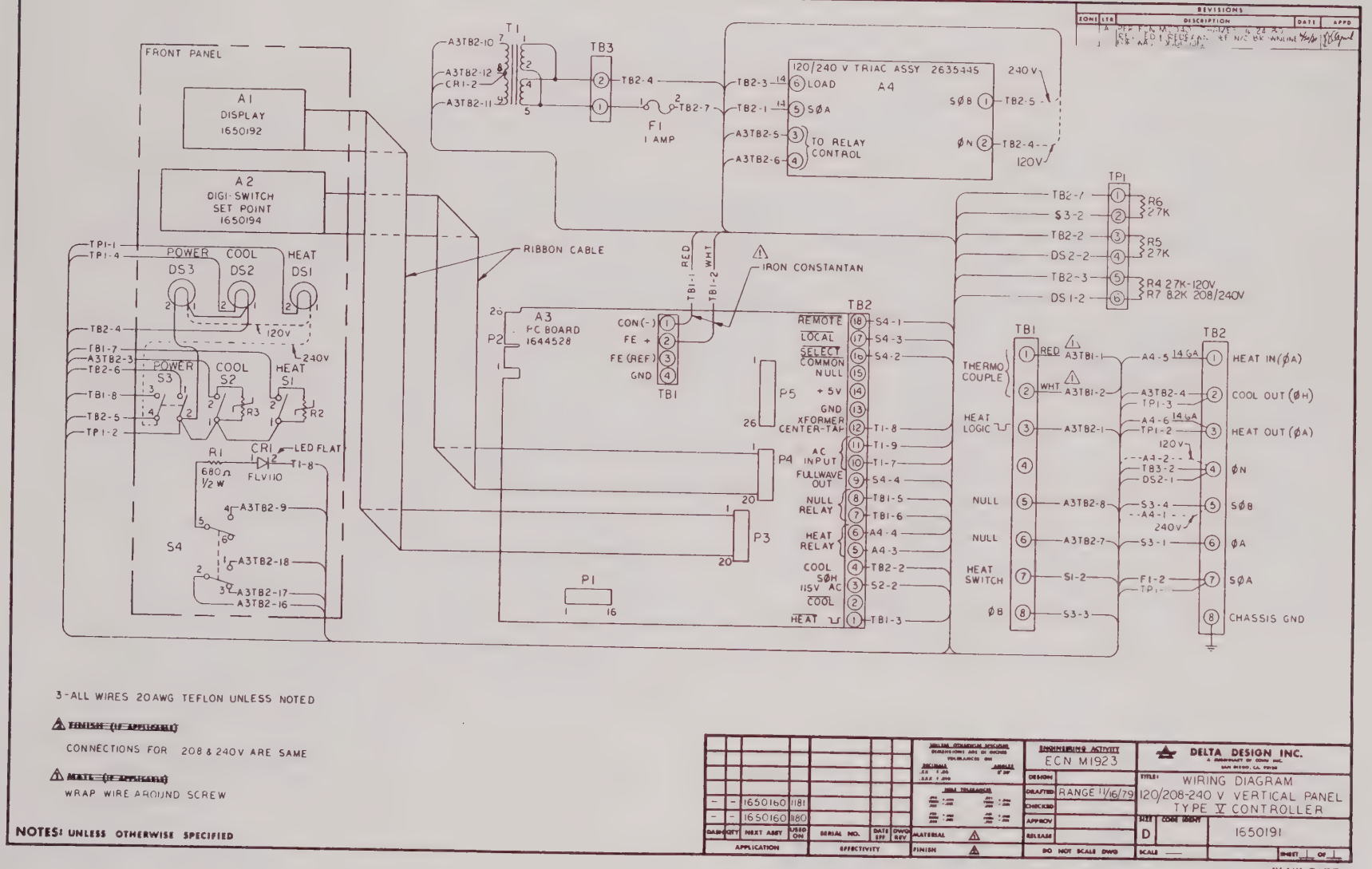
SCALE | SHEET 1 OF 1

BLUE CARD

TABLE IX. TYPE V CONTROLLER FOR CHAMBERS

REFERENCE: DWG. NO. 1650191

OPERATION	WIRE DESCRIPTION	TRIAC CONFIGURATION FROM	TRIAC CONFIGURATION TO	SSR CONFIGURATION FROM	SSR CONFIGURATION TO	
Remove & discard	AWG-20	TB2-5	A4-1*	N/A		
		OR TB2-4	A4-2**	N/A		
		A3TB2-5	A4-3	N/A		
		A3TB2-6	A4-4	N/A		
	*240VAC System **120VAC System					
Disconnect	All other wires to triac					
Reconnect	AWG-12	TB2-1	A4-5	TB2-1	Z1-1	
		TB2-3	A4-6	TB2-3	Z1-2	
Add	AWG-20	N/A		A3TB2-14	Z1-3	(+)
		N/A		A3TB2-1	Z1-4	(-)



3-ALL WIRES 20AWG TEFLON UNLESS NOTED

⚠ FINISH (IF APPLICABLE)

CONNECTIONS FOR 208 & 240V ARE SAME

⚠ MATE (IF APPLICABLE)

WRAP WIRE AROUND SCREW

NOTES: UNLESS OTHERWISE SPECIFIED

–	–	1650160	1181	
–	–	1650160	1180	

DASH QTY | NEXT ASSY | USED ON | SERIAL NO. | DATE EFF | DWGR REV

APPLICATION | EFFECTIVITY

MATERIAL ⚠

FINISH ⚠

ENGINEERING ACTIVITY: ECN M1923

DESIGN

DRAFTED: RANGE 11/16/79

CHECKED

APPROV

RELEASE

DO NOT SCALE DWG

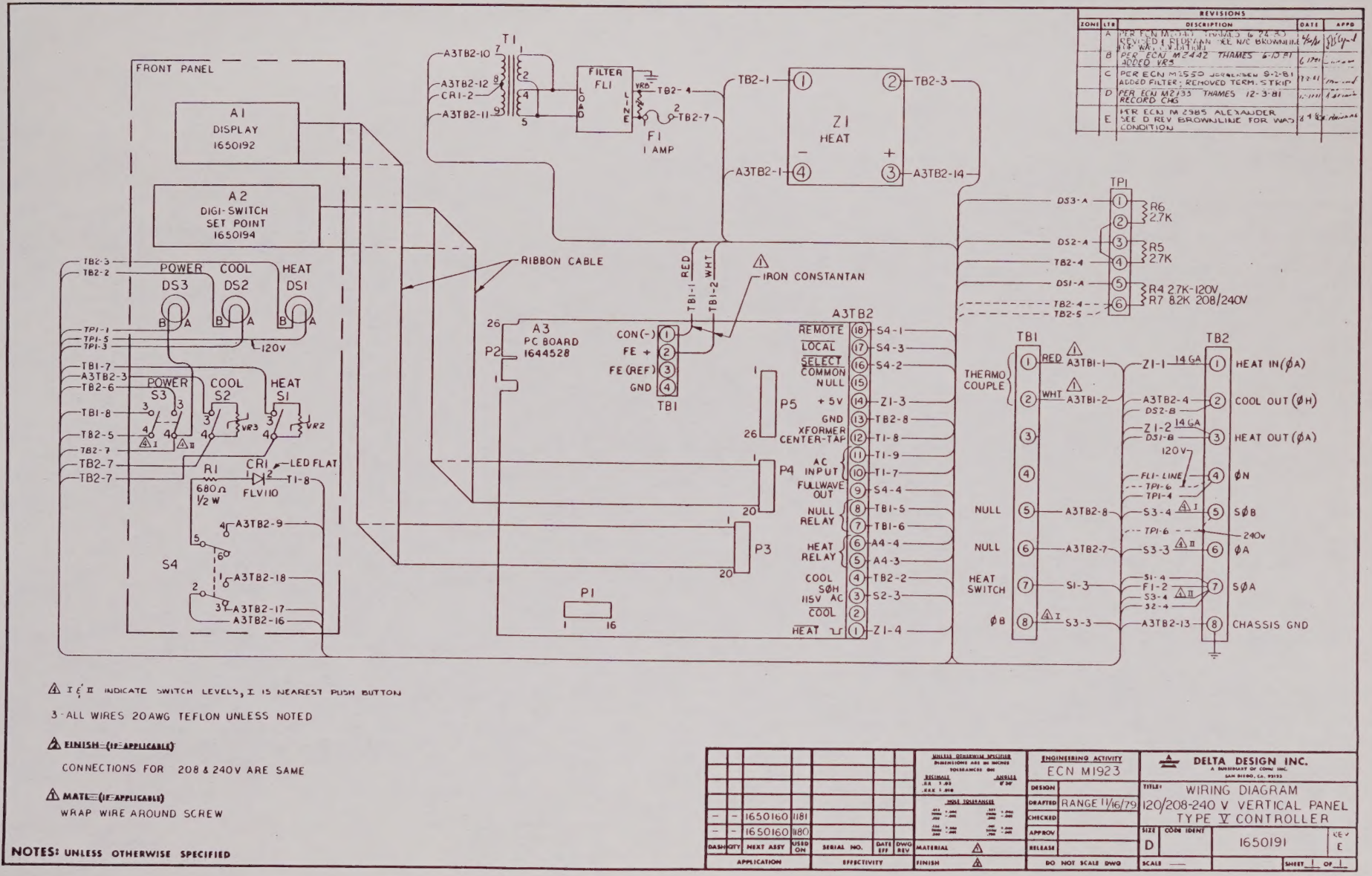
DELTA DESION INC.

TITLE: WIRING DIAGRAM 120/208-240 V VERTICAL PANEL TYPE V CONTROLLER

SIZE: D | CODE IDENT | 1650191

SCALE — | SHEET 1 OF 1

BLUE CARD



ZONE	LTR	DESCRIPTION	DATE	APPD
	A	PER ECN M2370 THAMES 6-24-81 ADDED & SLOPIAN SEE N/C BROWNLINE FOR WAS / IS CONDITION	6/24/81	[illegible]
	B	PER ECN M2442 THAMES 6-10-81 ADDED VR6	6/10/81	[illegible]
	C	PER ECN M2550 JORGENSEN 9-2-81 ADDED FILTER; REMOVED TERM. STRIP	9/2/81	[illegible]
	D	PER ECN M2733 THAMES 12-3-81 RECORD CHG	12/3/81	[illegible]
	E	PER ECN M2985 ALEXANDER SEE D REV BROWNLINE FOR WAS / IS CONDITION	4/1/82	[illegible]

⚠ I & II INDICATE SWITCH LEVELS, I IS NEAREST PUSH BUTTON

3 - ALL WIRES 20 AWG TEFLON UNLESS NOTED

⚠ FINISH = (IF APPLICABLE)

CONNECTIONS FOR 208 & 240V ARE SAME

⚠ MATE = (IF APPLICABLE)

WRAP WIRE AROUND SCREW

NOTES: UNLESS OTHERWISE SPECIFIED

DASH	QTY	NEXT ASSY	USED ON
–	–	1650160	1181
–	–	1650160	1180

APPLICATION | SERIAL NO. | DATE EFF | DWG REV EFFECTIVITY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON: DECIMALS .XX ± .03, .XXX ± .010; ANGLES ± 30'. MOST TOLERANCES: .XX ± .030, .XXX ± .010, FRACTIONS ± 1/64, ANGLES ± 1°

MATERIAL ⚠ FINISH ⚠

ENGINEERING ACTIVITY ECN M1923

DESIGN | DRAFTED RANGE 11/16/79 | CHECKED | APPROV | RELEASE

DO NOT SCALE DWG

DELTA DESIGN INC.
A SUBSIDIARY OF CONIC INC.
SAN DIEGO, CA. 92123

TITLE: WIRING DIAGRAM 120/208-240 V VERTICAL PANEL TYPE V CONTROLLER

SIZE D | CODE IDENT | 1650191 | REV E

SCALE — | SHEET 1 OF 1

BLUE COPY

SS RELAY CONFIGURATION

MP MASTER
MA32455